ADDENDUM NO. 1

City of Greenfield
Waterview Lift Station Relocation Project

Number of Pages (Including this page): 61

June 21, 2024

NOTICE TO BIDDERS – IT IS MANDATORY THAT, UPON RECEIPT OF THIS ADDENDUM, YOU 1) SIGN, 2) DATE, 3) WRITE IN YOUR COMPANY NAME, AND 4) RETURN THIS SHEET TO SAMANTHA PROULX OF AMERICAN STRUCTUREPOINT, SPROULX@STRUCTUREPOINT.COM – THANK YOU.

IF YOU HAVE ANY QUESTIONS CONCERNING THIS ADDENDUM, PLEASE CALL SAM PROULX @ (260) 373-0600.

1. Please sign below to acknowledge receipt of this addendum. _____	2. Please insert date of receipt. Date:_____	3. Please insert your company name _____	4. Please return to Bryan Hood. bhood@structurepoint.com

This addendum is being issued as a supplement to the specifications and drawings and shall be considered an integral part of the same. This addendum will become part of the contract documents.

ADDENDUM NO. 1

WATERVIEW LIFT STATION RELOCATION PROJECT
CITY OF GREENFIELD, INDIANA
AMERICAN STRUCTUREPOINT PROJECT NO. 2021.02592

JUNE 21, 2024

PREPARED BY:

AMERICAN STRUCTUREPOINT, INC.
116 E. BERRY STREET, SUITE 1515
FORT WAYNE, IN 46802

This Addendum forms part of the Contract Documents and modifies the original Bidding Documents as noted below. Acknowledge receipt of the Addendum in the space provided in the Bid Form. Failure to do so may subject Bidder to disqualification.

REVISIONS TO PROJECT MANUAL:

1. Replace BID-3 and BID-4 sheets: Bid item 010 (8" HDPE pipe directionally drilled) was removed. Item was replaced with 8" PVC SDR pipe (item 013)

PLANS:

1. Replace sheet C112. Replace 8" HDPE directionally drilled pipe with 8" PVC SDR 35 (open cut).

CLARIFICATIONS/QUESTIONS AND ANSWERS:

1. **Question:** How will the existing 6" force main be abandoned between the existing lift station and the discharge point as shown on sheet C-104?
   Answer: *The 6" force main is to be filled with flowable fill. Approximate length is 865'.*

2. **Question:** What sort of gate to use at the lift station?
   Answer: *Use a slide gate in lieu of the double swing gate as shown on sheet C-116.*

OTHER ITEMS ATTACHED:

1. The sign-in sheet for the pre-bid meeting, which was held June 12, 2024 is included with this addendum.
2. Acknowledgement of Addendum
3. Easement Agreement – For work within the county fairgrounds
4. Soils Report

END OF ADDENDUM NO. 1

(ADDENDUM No.1)

PART 3
CONTRACT ITEMS AND UNIT PRICES

Bid Item	Work Item Number	Description	Quantity	Unit	Unit Price	Item Total
001	01 11 21-A	MOBILIZATION AND DEMOBILIZATION	1	LS		
002	01 11 21-B	CONSTRUCTION CONTINGENCY	1	LS	$50,000.00	$50,000
003	01 71 16-A	VIDEO DOCUMENTATION OF CONDITIONS	1	LS		
004	01 55 26-A	MAINTENANCE AND PROTECTION OF TRAFFIC	1	LS		
005	33 05 13.16-F	ABANDON EXISTING PUMP STATION	1	LS		
006	01 11 21-C	PLUG EXISTING 6" PIPE AT MANHOLE NEAR KIRKPATRICK PL.	1	LS		
007	33 32 19-A	REGIONAL PUMP STATION AND RELATED APPURTENANCES	1	LS		
008	33 05 38.16-A	12" FORCE MAIN, HDPE, DR 11 (Open Cut)	274	LF		
009	33 05 38.16-A	12" FORCE MAIN, HDPE, DR 11 (Directionally Drilled)	702	LF		
010		**ITEM REMOVED**				
011	33 31 11-B	18" PVC, SDR 35, SANITARY SEWER	1,732	LF		
012	33 31 11-C	12" PVC, SDR 35, SANITARY SEWER	317	LF		
013	33 31 11-D	8" PVC, SDR 35, SANITARY SEWER	171	LF		
014	33 31 11-E	6" SEWER LATERALS	700	LF		
015	33 31 11-F	CLEANOUTS	20	EA		
016	33 05 34.13-A	12" RCP, STORM SEWER	51	LF		
017	33 49 13-A	STORM PIPE, REMOVE (ALL SIZES)	50	LF		
018	33 49 13-B	DRAIN TILE REPAIR (Assumed Quantity)	5	EA		
019	33 49 13-C	CASTING, INLET, ADJUST TO GRADE	5	EA		
020	33 49 13-D	STORM SEWER INLET WITH CASTING	3	EA		
021	33 49 13-D	48" STORM SEWER MANHOLE	1	EA		
022	33 05 13.16-A	48" SANITARY MANHOLES	13	EA		
023	33 05 13.16-B	MANHOLE REMOVAL/ABANDONMENT	6	EA		
024	33 05 13.16-C	INLET, REMOVE	3	EA		
025	33 05 13.16-D	SEWER CONNECTION TO EXISTING MANHOLE	5	LS		

026	33 05 13-E	FORCE MAIN CONNECTION TO MANHOLE	1	LS		
027	31 23 17-A	STONE DRIVE REPAIR, 8" Depth	600	SY		
028	31 23 17-B	COMPACTED AGGREGATE, NO. 53 / 73	2,300	CY		
029	31 23 17-C	FLOWABLE FILL FOR PIPE ABANDONMENT	25	CY		
030	32 12 16-A	COMMON EXCAVATION (ASPHALT PAVEMENT)	396	CY		
031	32 16 23-A	PAVEMENT REMOVAL (CONCRETE PAVEMENT)	3,630	SY		
032	32 16 23-B	CURB RAMP, CONCRETE	20	SY		
033	32 16 23-C	CURB AND GUTTER, ROLL CURB	2,156	LF		
034	32 16 23-D	CURB AND GUTTER, REMOVE	2,156	LF		
035	32 16 23-E	SIDEWALK, CONCRETE	125	SY		
036	32 16 23-F	SIDEWALK, CONCRETE, REMOVE	145	SY		
037	32 12 16-B	ASPHALT SURFACE	282	TON		
038	32 12 16-B	ASPHALT INTERMEDIATE	520	TON		
039	32 12 16-B	ASPHALT BASE	1,045	TON		
040	32 12 16-C	MILLING, ASPHALT, 1 1/2 IN.	263	SY		
041	32 92 19-A	SEEDING AND RESTORATION	1	LS		
042	01 57 13-A	EROSION CONTROL	1	LS		

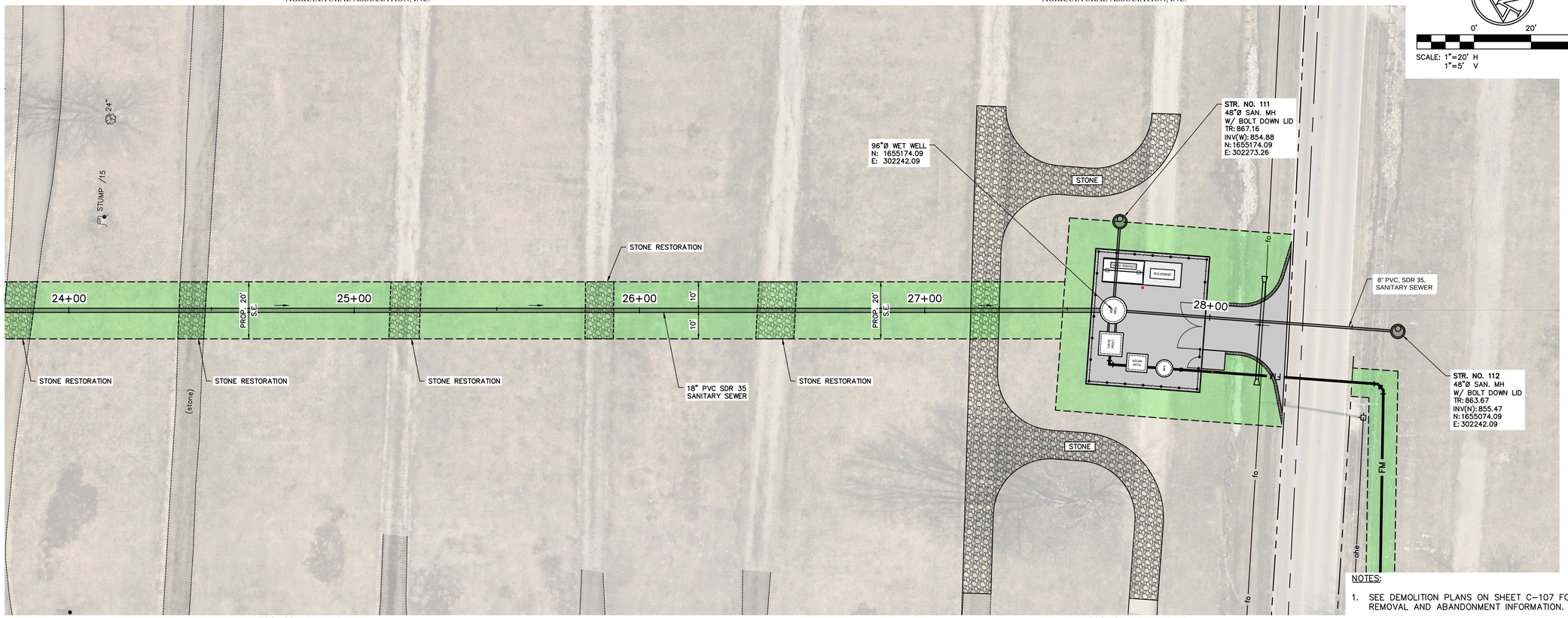
A. Total of Base Bid Items (in words):	*(In figures)*
	$

100 YEAR FLOOD PLAIN EL. 869.0

ADDENDUM No. 1

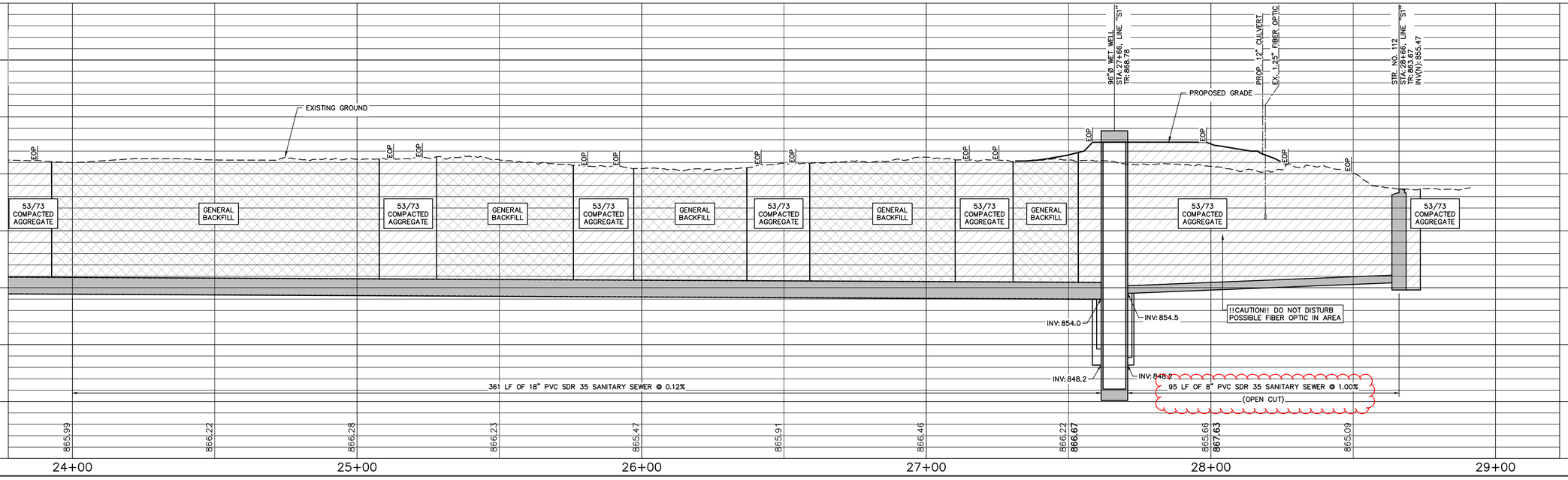
HANCOCK COUNTY 4-H CLUB AGRICULTURAL ASSOCIATION, INC.

HANCOCK COUNTY 4-H CLUB AGRICULTURAL ASSOCIATION, INC.



NOTES:

1. SEE DEMOLITION PLANS ON SHEET C-107 FOR REMOVAL AND ABANDONMENT INFORMATION.
2. SEE SHEET C-116 FOR SITE PLAN.
3. CONSTRUCTION ACTIVITIES WITHIN THE FAIRGROUNDS PROPERTY SHALL BE LIMITED FROM AUGUST 1st THRU MARCH 1st.



PLOT DATE: 6/21/2024 10:55 AM EDITED BY: PTRAWINSKI DRAWING FILE: \\INDYSANP\PROJECTS\2021\02592\D. DRAWINGS\UTILITY INFRASTRUCTURE\202102592_UI_PP.DWG

CITY OF GREENFIELD

AMERICAN STRUCTUREPOINT INC.

9025 River Road | Suite 200 | Indianapolis, Indiana 46240
TEL 317.547.5580 | FAX 317.543.0270
www.structurepoint.com

WATERVIEW LIFT STATION RELOCATION

Greenfield, Indiana

BRYAN L. HOOD REGISTERED No. 11500233 STATE OF INDIANA PROFESSIONAL ENGINEER

Bryan L Hood 5/10/2024
CERTIFIED BY

ISSUANCE INDEX
DATE:
5/10/2024
PROJECT PHASE:
CONSTRUCTION DOCUMENTS

REVISION SCHEDULE		
NO.	DESCRIPTION	DATE
1	ADDENDUM NO. 1 PIPE MATERIAL CHANGE	6/21/24

Project Number 2021.02592

PLAN AND PROFILE SANITARY SEWER

C-112

Sign In Sheet

Waterview Lift Station Relocation

Pre-Bid Meeting

6/12/2024

Name	Agency	e-mail	Phone
Nick Dezelan	City ~~of Crown Point~~ Greenfield	ndezelan@greenfieldin.org	317-538-3777
Bryan Hood	American Structurepoint	bhood@structurepoint.com	260-417-6312
John Kindred	Kindred EX	kindredexcavating@hotmail	317-750-8402
Bryan Fleming	KINDRED EX	BRYAN@KINDREDEXCAVATING.COM	317-778-3559
Matt Cordial	Kokosing	dmce kokosing.biz	614-425-9221
SEAN BOLAND	MAXIM AUTOMATION	SEAN@MAXIMAUTOMATION.com	317 4189561
Josh Pardue	Xylem	josh.pardue@xylem.com	(317) 563-4141
Cory McNutt	Blue Tank & Pump	CoryMcNutt@bluetankandpump	(317) 533-1222
Ian Puckett	F.A. Wilhelm	ianpuckett@fawilhelm.com	661-699-6329
AJ Hunnickhouse	Greenfield	ahunnickhouse@greenfieldin.org	(317)526-3016
Scott Evans	Greenfield	sevans@greenfieldin.org	(317)526-0013
Jane Webb	Greenfield	jwebb@greenfieldin.org	(317)437-9442
Caleb Osborne	Greenfield	Cosborne@greenfieldin.org	317-967-0025
Greg Roland	Greenfield	GRoland@greenfieldin.org	317-477-4320

CTL Engineering, Inc.
1310 S. Franklin Road
Indianapolis, Indiana 46239
Phone: (317) 295-8650 • Fax: (317) 295-8395
www.ctleng.com

Consulting Engineers – Testing – Inspection Services – Analytical Laboratories

June 14, 2023

American Structurepoint
116 E. Berry Street, Suite 1515
Fort Wayne, IN 46802

Attention: Mr. Bryan Hood, PE
Project Manager, Utility Infrastructure Group

Reference: Geotechnical Investigations
Waterview Lift Station Relocation
Greenfield, IN
CTL Project No.: 23050007IND

Dear Mr. Hood:

In accordance with your authorization to proceed, CTL Engineering, Inc. has completed the geotechnical investigation on the above referenced site. The report includes the results of the field and laboratory testing, and foundation recommendations for the proposed lift station and earth related phases of the project.

Thank you for the opportunity to be of service to you on this project. If you have any questions or need further information, please contact us at (317) 295-8650.

Sincerely,

CTL ENGINEERING, INC.

Shawn M. Marcum, PE
Senior Project Engineer

GEOTECHNICAL INVESTIGATION

WATERVIEW LIFT STATION RELOCATION
GREENFIELD, IN
CTL PROJECT NO.: 23050007IND

PREPARED FOR:

AMERICAN STRUCTUREPOINT
116 E. BERRY STREET, SUITE 1515
FORT WAYNE, IN 46802

PREPARED BY:

CTL ENGINEERING, INC.
1310 S. FRANKLIN ROAD
INDIANAPOLIS, INDIANA 46239

JUNE 14, 2023

TABLE OF CONTENTS

Page

I. PROJECT INFORMATION 1
II. SUBSURFACE INVESTIGATION 1
III. FINDINGS 2
A. Subsurface Conditions 2
B. Groundwater 4
IV. DISCUSSION AND RECOMMENDATIONS 4
A. Site Preparation and Earthwork 5
B. Excavation Considerations 6
C. Groundwater Management 8
D. Lift Station Support 9
E. Uplift Forces 11
F. Pipe Support 11
1. Open-Cut Method 11
2. Trenchless Installation Method 13
G. Backfill Considerations 14
H. Seismic Coefficients 14
V. CONCLUDING REMARKS 15

LIST OF TABLES

Table 1 – Groundwater Depths 4
Table 2 – Estimated Soil Parameters for Shoring Design 8
Table 3 – Allowable Soil Bearing Capacity 9
Table 4 – Estimated Soil Parameters for Wet Well 10

LIST OF APPENDICES

APPENDIX A GENERAL LOCATION PLAN
BORING LOCATION PLAN

APPENDIX B TEST BORING RECORDS

APPENDIX C LABORATORY TESTING

APPENDIX D SOIL PROFILES

APPENDIX E SEISMIC COEFFICIENTS

I. PROJECT INFORMATION

The project involves the replacement of the existing Waterview lift station on a site north of Park Avenue in Greenfield, Indiana. The project also includes the installation of a new gravity sewer along Waterview Blvd and a new force main along Park Avenue. The 60% plans provided by American Structurepoint, Inc. dated 11/17/2022 indicate that:

- The proposed lift station will be 40 feet by 47.6 feet in plan dimension constructed at a final elevation of 870 approximately 5 feet above existing grade. The new lift station consists of wet well, valve vault, flow meter, ARV and pads for generator and control shelter. The proposed wet well is expected to be 8 feet inside diameter with an invert elevation at 847.9, approximately 18.5 ft below existing grade. The valve vault is expected to be 6 feet by 7 feet bearing at elevation 862.7, approximately 3 ft below existing grade. The flow meter and ARV structures will also be constructed at elevation 862.7. The control shelter will be constructed with 8-inch slab-on-grade near elevation 870 with turn-down edges (footings) 3 feet below exterior grade.

- The proposed gravity sewer line starts at Station 10+00 Line "S1" approximately 350 feet north of the intersection of Waterview Blvd and Lake View Drive, heading south along Waterview Blvd to the proposed lift station ending at Station 23+13 Line "S1" approximately 230 feet south of the intersection of Waterview Blvd and Creek Wood Drive for approximately 1313 feet in length. The gravity sewer is proposed to be constructed at depths ranging between 7 and 11 feet below existing grade.

- The proposed force main starts at Station 12+88 Line "F1" approximately 290 feet east of the intersection of Pratt Street and E Park Ave, then heading along E Park Ave for approximately 700 feet then heading north for about 525 feet then east ending at Station 26+70 Line "F1" at the proposed lift station for about 1382 feet in length. The force main is proposed to be constructed at depths ranging between a minimum of 5 feet to 7 feet below existing grade and a minimum of 10 feet deep at Brandywine Creek crossing.

II. SUBSURFACE INVESTIGATION

One (1) test boring, designated as B-3, was drilled in the vicinity of the proposed lift station to a depth of 25 feet below the existing grade, and five (5) test borings designated as B-1, B-2, B-4, B-5 and B-6 were drilled for the proposed gravity sewer and force main to depths ranging between 10 feet and 25 feet below the existing grade. The test borings were drilled at the approximate locations shown on the attached Boring Location Plan in Appendix A.

The test borings were advanced with a truck mounted drilling rig utilizing hollow stem augers (HSA) and solid flight augers (SFA) on May 11th and May 12th, 2023. Standard Penetration tests were conducted using a 140-pound automatic hammer falling 30 inches to drive a 2-inch O.D. split barrel sampler for 18 inches.

Soil samples obtained from the drilling operation were preserved in glass jars and visually classified in the field by the drilling crew and in the laboratory by a geotechnical engineer and tested for Natural Moisture Content. Representative soil samples were tested for Grain Size Distribution, Atterberg Limits and pH.

Drilling, soil sampling and laboratory testing were performed following standard geotechnical engineering practices and current ASTM procedures. Results from field tests are shown on the enclosed Test Boring Record in Appendix B and laboratory test sheets in Appendix C.

Boring locations and depths were provided by the client and then the Latitude and Longitude coordinates of the test borings were estimated from Google Earth and located on site using a Trimble Geo7X GPS system. Surface elevation of the test borings were estimated from the 60% plans provided by American Structurepoint, Inc. dated 11/17/2022. Location, Latitude and Longitude coordinates and elevations shown on the Boring Location Plans in Appendix A, Test Boring Records in Appendix B and Soil Profiles in Appendix D should be considered approximate.

III. FINDINGS

A. Subsurface Conditions

Test boring B-1 encountered 7.5 inches of full depth Portland Concrete Cement (PCC) pavement over 8 inches of base material. Below the pavement structure, the test boring encountered loose to medium dense clayey sand (SC) and silty sand (SM) to a depth of approximately 5.5 feet. Below, dense to medium dense clayey sand (SC) and silty sand with gravel (SM) soils were encountered to the boring termination depth of 10.0 feet. Standard penetration (N-values) of the soils ranged from 7 to 34 blows-per foot (bpf). Moisture content of the soils ranged between 10 to 24 percent.

Test boring B-2 encountered 7 inches of topsoil over soft to medium stiff sandy lean clay (CL) to a depth of 4.0 feet. Below, the test boring encountered loose to medium dense silty sand (SM) soils to the boring termination depth of 15.0 feet. N-values of the soils ranged from 4 to 16 bpf. Moisture content of the soils ranged between 6 to 16 percent.

Test boring B-3 encountered approximately 2 in. of topsoil over medium stiff sandy lean clay (CL) soil to a depth of approximately 3.0 feet. Below, the test boring encountered very soft to soft silty clay (CL-ML) and lean clay (CL) soils containing organic matter and marl to an approximate depth of 8.5 feet. The soil deposits between depth of 3 to 8.5 feet exhibited Loss on Ignition (LOI) values ranging from 11.3 to 13.3 percent, Calcium Carbonate ($CaCO_3$) values of 13.6 to 27.6 percent and natural moisture content values of 96 and 155 percent. Below the soft soil layers, the test boring encountered medium dense silty sand (SM) soil to a depth of 19.5 feet, underlain by very stiff glacial tills classified as sandy silt (ML) to a depth of approximately 23.0 feet. Medium dense well graded sand with silt (SW-SM) and clayey sand (SC) were encountered to the boring termination depth of 25 feet. N-values of the organic/marly soils ranged from 0 to 2 bpf while N-values of the underlaying glacial soils ranged from 6 to 27 bpf.

Test boring B-4 encountered approximately 6 inches of topsoil over soft silty clay (CL-ML) cohesive soil to a depth of 1.5 feet. Below, the test boring encountered loose silty sand (SM) soil to a depth of approximately 6 feet. Below, dense poorly graded gravel with clay (GP-GC) soils were encountered to an approximate depth of 8.0 feet over medium dense silty sand with gravel (SM) soils to the boring termination depth of 25 feet. A very stiff sandy silt (ML) soil layer was encountered between depths of 19 and 21 feet. N-values of the soils ranged from 4 to 42 bpf. Moisture content of the soils ranged between 10 to 38 percent.

Test borings B-5 and B-6 encountered 11 to 12 inches of full depth Hot-Mix Asphalt (HMA) at the surface. Below the pavement, the test borings encountered unstratified, unsorted silty sand (SM), silty clay (CL-ML), sandy lean clay (CL) poorly graded sand with clay (SP-SC) soils. N-values of the soils ranged from 3 to 22 bpf. Moisture content of the soils ranged between 12 to 34 percent. Blowcounts in excess of 50 bpf may be recorded due to presence of cobbles and/or large gravel.

The cohesive soils exhibited Liquid Limit (LL) values ranging from 30 to 31 percent and Plasticity Index (PI) value of 14 percent. The pH values of the representative subgrade soils ranged from 6.3 to 7.1.

Detailed information of soil type and standard penetration values are shown in the Test Boring Records in Appendix B. A generalized soil profile of the test borings is included in Appendix D.

B. Groundwater

Groundwater levels and soil cave-in depths were recorded during and following the drilling operation as shown on the enclosed Test Boring Record in Appendix B and as summarized below in Table 1. It should be noted that groundwater levels recorded during this subsurface investigation are generally not a reliable indication of long term groundwater levels. Fluctuations in the groundwater level can occur with seasonal and weather conditions.

Table 1 – Groundwater Depths

Boring Number	Boring Depth (feet)	Boring Elevation (feet)	Groundwater Readings (feet)			Cave-in Depth (feet)
			During Drilling	At Completion	Delayed	
B-1	10.0	870	8.5	0.1	(1)	10.0
B-2	15.0	867	9.0	6.5	Dry @ 24Hrs	7.5
B-3	25.0	866	4.0	3.0	5.0 @ 24Hrs	5.2
B-4	25.0	865	4.5	3.5	4.0 @ 24Hrs	4.0
B-5	15.0	864	6.0	5.5	(1)	11.0
B-6	15.0	866	6.5	Dry	(1)	4.0

(1) *Delayed groundwater reading was not recorded as the borehole had to be backfilled and pavement patched for safety of pedestrian and vehicular traffic.*

IV. DISCUSSION AND RECOMMENDATIONS

CTL Engineering understands that the grade of the proposed lift station will be raised from about Elevation 865 to Elevation 870. Based on test boring B-3 drilled within the area of the proposed lift station, the soils in the upper 8.5 feet contain organic matter and marl and are generally weaker than the soils encountered at deeper depths and are considered unsuitable to support the proposed structures of the lift station and the proposed 5 feet of new fills. Groundwater was encountered at or below 3 feet below the existing grade.

Based on the above considerations, it is recommended that the very soft to soft, organically contaminated soils in the upper 8.5 feet be removed and replaced with an approved fill material. Limits of removal and replacement of the organically contaminated soils shall extend to a minimum of 10 feet beyond the foot print of the proposed left station in all directions. Excavations should be observed and approved by Geotechnical Engineer prior to placement of the new fill material. If the soils below 8.5 feet exhibit weak conditions, then the weak soils should be removed and replaced. Also, groundwater is expected in excavations extending below 3 feet below existing grade. In such an event, the water level may need to be temporarily lowered to facilitate fill placement to the level of existing grade.

Removed soils are considered unsuitable for re-use. It is recommended that a waiting period of a minimum of two (2) weeks be observed after the new fill is placed, and prior to placement of footings or supporting pads for the structures.

The underlying soils in the areas of the proposed gravity sewer and force main are generally anticipated to provide suitable support. Also, groundwater is expected in excavations extending below 3 feet below existing grade. In such an event, the water level may need to be temporarily lowered to facilitate fill placement of pipes and proposed fills.

Site Preparation and earthwork, groundwater management, excavation considerations, foundation support recommendations, and backfill considerations are provided in the following paragraphs.

A. Site Preparation and Earthwork

1. All surface objects, grass, vegetation, pavement, topsoil and roots, shall be removed from within the construction limits. Topsoil can be stockpiled separately and reused for landscaping purposes.

2. During earthwork operations, care should be taken to provide adequate drainage on the exposed soils. Absorption of heavy rainfall, accumulations of water and heavy construction traffic may result in softening of these soils, hence, severely weakening the strength of the subgrade soils.

3. On-site excavated soils, except topsoil and soils with organic matter of more than 3 percent and/or in-place moisture content value of 4 percent above the optimum moisture content, are considered suitable for use as backfill provided proper moisture content is maintained during placement. A portion of the excavated soils may exhibit natural moisture content above the optimum moisture. Such soils may require air-drying and/or chemical modification for re-use. Additional fill, if required, may consist of INDOT B-borrow, No. 53 stone, No. 73 stone, sand and gravel material, flowable fill, or as otherwise directed by the Engineer.

4. Topsoil, organically contaminated material and/or soils with Liquid Limit of more than 50 percent are not suitable for use as fill. Additionally, soils with a maximum dry weight of less than 100 pounds per cubic foot should not be used in the upper 12 inches of the subgrade beneath sidewalks and paving areas. All fill material should be tested, inspected and approved by the Engineer.

5. Depending upon the time of construction and seasonal amount of precipitation, ponding and/or perched water may be encountered in some locations. In such an event, water should be diverted through trenches and removed using

construction sump pumps or otherwise as suggested by the Contractor and approved by the Engineer.

B. Excavation Considerations

1. Excavation into the underlying soils to the proposed invert elevations for the lift station structures, gravity sewer and force main may be accomplished using high powered excavation equipment. Very soft to medium stiff clays and loose to medium dense silty sand should be expected. Gravel and cobbles are anticipated to be encountered during excavations in some locations.

2. Subsequent to removal of soil overburden, soft/loose soils may be encountered in the form of soil swelling and/or liquefaction "boiling condition" particularly where groundwater is present. In such an event, the soft/loose soils should be compacted or removed and replaced with angular coarse gravel such as No. 53 stone or as otherwise directed by the Engineer. It may be necessary to surge No. 2 stone into the foundation soils to form a suitable working base in which to place compacted engineering fill. Very soft to soft clayey soils containing organic matter and marl shall be removed and replaced with an approved fill material in the area of the proposed lift stations. As stated above, limits of removal and replacement of the organically contaminated soils shall extend to a minimum of 10 feet beyond the foot print of the proposed lift station structures in all directions.

3. Excavations in excess of 5 feet in depth should be sloped and/or shored according to OSHA requirements. Excavation for the lift station may be laid back at a rate no steeper than 3:1 (H:V) due to presence of groundwater. The excavated side slopes should be designed, observed and approved during construction by an experienced Registered Engineer.

   If excavations cannot be sloped as recommended, the excavated sidewalls should be shored or shielded using a trench box system, sheet piling, soldier pile and lagging system, or equivalent shoring system for maintaining the excavations and surrounding area in a safe condition. The temporary shoring systems may be designed using the estimated soil parameters provided below in Table 2. Design of the temporary shoring system should also take into account the influence of loads which will be applied adjacent to the excavation such as dead and live loads from structures, vehicular/construction traffic loading, and loading due to stockpiled material. Care should be taken while excavating adjacent to existing structures or roadways so as not to undermine the existing soil support.

4. Nearby structures including pavements/sidewalks and other surface supported features should be monitored to evaluate the effect of the excavation and dewatering. Results of the monitoring should be provided to the Structural Engineer on a daily basis. The Structural Engineers should determine acceptable limits of lateral and vertical deflections prior to excavation. In the event that excessive lateral or vertical movement is noted, the Structural Engineers should be notified immediately.

5. Groundwater, surface runoff and other accumulations of surface water shall be diverted or removed from excavations. The Contractor shall make every effort necessary to secure a dry condition of bottom of excavation prior to placement of footings in conformance with local codes. The Contractor shall provide, install, and operate sufficient trenches, sumps, pumps, hoses, piping, wellpoints or other means necessary to depress and maintain the groundwater level below the base of the excavation as needed.

6. Temporary shoring systems, where required, should be designed by a Licensed Engineer familiar with the design of earth retention systems. The design of the shoring system should also take into account loading adjacent to the excavation such as foundation or vehicular loads and soil stockpiles. The design of shoring systems is beyond the scope of this investigation.

7. Where dewatering will be required, the groundwater level should be lowered at least 3 feet below the base of excavations using wells, well points, or sumps. The dewatering system should be designed and installed by a specialty dewatering contractor. Please refer to Table 1 for groundwater elevations. Groundwater is anticipated to be encountered during construction. Fluctuations in the groundwater level can occur with seasonal and weather conditions.

Table 2 – Estimated Soil Parameters for Shoring Design

Soil Parameters	Materials Type				
	Fill	Sandy Lean Clay	Silty Sand	Sandy Silt Till	Well Graded Sand
Total Unit Weight, pcf	125	120	120	130	130
Cohesion, psf	0	0	0	0	0
Angle of Internal Friction, Degrees	32	25	30	32	32
At Rest Pressure, K_o	0.47	0.58	0.50	0.47	0.47
Active Pressure, K_a	0.31	0.41	0.33	0.31	0.31
Passive Pressure, K_p	3.25	2.46	3.00	3.25	3.25

C. Groundwater Management

Excavations for the proposed lift station structures, gravity sewer and force main are anticipated to encounter groundwater ranging from near the existing ground surface and to depth of approximately 9 feet as summarized in Table 1. It is recommended that the groundwater level be maintained at least 3 feet below the deepest anticipated excavations at lift station structures, gravity sewer and force main. The groundwater level should be maintained at this level until the structure and pipe installations are complete and the backfill is placed around the structure so that hydrostatic forces do not lift the structures.

Temporary dewatering during excavation and construction will be required. The type of dewatering system required could include relatively large deep wells, or numerous small shallow wells, or a well point system. A general contractor will determine which system to use based on his/her means and methods to construct the below-grade structures. Design of the dewatering system is beyond our scope of work.

The temporary dewatering should be performed continuously and should begin prior to general excavation, so that the water level is lowered, and the subgrade material do not become disturbed during excavation. In addition, dewatering should be continued until the excavations are backfilled to a minimum of 3 feet above the groundwater levels that are encountered during construction, so that hydrostatic forces do not lift the structures and also to permit proper placement of backfill material.

In addition to the general dewatering, discontinuous granular seams or layers may have to be drained by pumping or bailing from isolated sumps. Alternatively, water from these isolated zones may be piped or otherwise directed to the general dewatering system. The need for and the extent of these additional dewatering measures would have to be determined during construction.

The dewatering system should be carefully designed so that adjacent wells, structures, buildings, roadways and excavated slopes are not adversely affected by the operation. The pumping rate should be calculated, and screen sizes determined. Pumped water should be disposed in a legal manner.

D. Lift Station Support

The lift station structures are anticipated to be constructed on individual mat foundations. Based on the 60% plans received from American Structurepoint, Inc., the foundation for the wet well will be constructed at an approximate Elevation of 847, the foundation support for the valve vault, flow meter and ARV will be at Elevation of 862.7, and pads for generator and control shelter will be near finished grade at Elevation 870.0. As stated above, it is recommended that the very soft to soft, organically contaminated soils in the upper 8.5 feet be removed and replaced with an approved fill material. Limits of removal and replacement of the organically contaminated soils shall extend to a minimum of 10 feet beyond the foot print of the proposed left station in all directions.

Provided the above recommendations are implemented, the mat foundations for the wet well, valve vault, flow meter, ARV and turned-down footings for the shelter may be designed using net allowable soil bearing capacity value of 3,000 pounds per square foot (psf) as summarized in Table 3.

Table 3 – Allowable Soil Bearing Capacity

Structure	Approximate Bearing Elevation	Soil Type	Allowable Soil Bearing Capacity (psf)	Modulus of Subgrade Reaction (pci)
Wet Well	848	Silty Sand	3,000[(1)]	150[(1)]
Valve Vault Flow Meter ARV Shelter	862	Compacted Fill	2,000	150

[(1)] *Provided a foundation pad consisting of 6-inches crushed aggregate (such as INDOT #8 or #53 aggregate) is placed below foundation.*

It is assumed that the below-grade walls of the lift station structures will be designed as rigid, non-yielding structures that are not allowed to rotate. It is also assumed that a portion of the excavation may utilize a temporary retention system to construct the below-grade portion of the proposed structure. The total soil unit weight and at-rest lateral earth pressures along with hydrostatic pressure due to groundwater should be used to design the below-grade walls. The estimated equivalent fluid pressures for dry and submerged conditions are provided below in Table 3.

Settlement of foundations supported as recommended may vary due to variations in soil composition, void ratio, and loading. Provided that the above recommendations are implemented and a minimum waiting period of two (2) weeks is observed after the new fill is placed, it is estimated that the total and differential settlements will be less than 1 inch and ½ inch, respectively. However, it should be noted that differential settlements between piping and the structures may approach 1 inch.

Exterior footings should be constructed at a minimum depth of 3 feet below the lowest adjacent exterior grade to offset the effects of frost penetration.

An at-rest lateral earth pressure coefficient, (K_0), of 0.45 can be used if structure backfill consisting of clean sand and gravel with less than 5 percent fines is used as backfill around the proposed below-grade structures. For the structure backfill, at-rest coefficient value of 0.45 to be valid, the structure backfill must extend out from the base of the wall at an angle of a least 45 degrees from the vertical.

Table 4 – Estimated Soil Parameters for Wet Well

Backfill Material Type	Elevation (feet)	Condition	Total Unit Weight (pcf)	Estimated Friction Angle (degrees)	At-Rest Coefficient (K_o)	Equivalent Fluid Pressure (pcf)
Compacted Fill	870-865	Dry	125	32	0.47	61
Compacted Fill	865-856	Submerged *	63	32	0.65	29
Silty Sand	8.5 – 19.5	Submerged *	58	30	0.50	29
Sandy Silty Till	19.5 – 23.0	Submerged *	68	32	0.47	32
Well Graded Sand	23.0 – 25.0	Submerged *	68	32	0.47	32

** Water pressure of 62.4 pcf should be added for the design of the wall.*

The design of the walls and floors should account for the additional hydrostatic pressure due to the existing groundwater level. The groundwater level was recorded at a depth of 4 feet during drilling, 3 feet upon completion and 5 feet after 24 hours of drilling operations below the existing grade. However, the groundwater level may fluctuate depending on seasonal and weather condition. It is recommended that a high groundwater level of El 865 feet be used in design of the structure.

The design of the walls should also take into account the influence of surcharge loads that will be applied adjacent to the below-grade structure, such as foundation and floor or vehicle loads. Also, it is recommended that the weight of the structure be increased to protect the structures against uplift with a minimum Factor of Safety of 1.2 against uplift. A high ground water elevation equal to the ground surface of El. 865 should be used in design.

Although sliding will most likely not be an issue for the proposed structure, an allowable coefficient of friction between the mat foundation and the underlying crushed stone of 0.3 can be used when calculating sliding resistance along the base of the structure.

E. Uplift Forces

Due to the presence of groundwater, uplift forces will act on the structure. There are several methods available to resist these forces. Resisting the uplift forces could be done by increasing the weight of the structure by thickening the mat or providing a lip around the structure to include the weight of the soil above the lip. A design high ground water depth equal to the existing ground surface (El 865) is recommended.

F. Pipe Support

Plans indicate that the gravity sewer and force main invert will typically be between approximately 5 to 11 feet below the existing ground surface.

1. Open-Cut Method

a. The subgrade of pipe support may vary along the gravity sewer and force main alignment. The soils, in their native conditions, will generally be expected to provide adequate support for the pipes. Additionally, soils exposed to standing water can soften/loosen and be easily disturbed by construction activities, particularly in the presence of water. In such an event, it is recommended that a minimum of 6 inches of the disturbed soils be over excavated, and that this over-

excavation be backfilled with coarse aggregate such as No. 53, No. 5 or No. 8. The gravel will provide uniform support for the pipe, can be utilized in the dewatering process, and can act as a mudmat to help protect the soils from further disturbance by water and construction activities.

b. Backfill material should be placed in layers not exceeding 8 inches in loose lift thickness, with each layer compacted to meet the appropriate requirements listed below, or as otherwise specified by the Engineer. The engineered fill should not be placed in a frozen condition or over a frozen subgrade.

- Trenches within the influence zone of roadways, sidewalks, or any structures should be compacted to a minimum 98 percent of the material's standard Proctor maximum dry density (MDD) as determined by ASTM D 698 to reduce the potential risk for settlement of the fill beneath the surface supported features.

- Trenches in areas outside the influence line for support of any structures, roadways or pavement should be compacted to at least the density of the surrounding ground but not less than 95 percent of the material's standard Proctor maximum dry density (MDD) as determined by ASTM D 698, or as otherwise specified by the Engineer.

c. Groundwater is expected in excavations extending below the groundwater depths recorded above in Table 1. Dewatering can be accomplished as recommended above in section IV.C.

d. Pipe installation, trench width, bedding and backfill compaction should be performed in accordance with applicable project, local, and state codes.

e. The recommendations provided in this report are based on the results of the soil borings taken at specific locations, and at the time designated on the test borings. Soil conditions and groundwater levels can vary between boring locations and from the time of the subsurface exploration to the time of construction. These variations may not become evident until the time of construction. Variations in soil conditions between borings should be expected.

2. Trenchless Installation Method

Trenchless method may be used on this project. Below are general recommendations regarding the trenchless installation methods.

a. Very soft to soft clays with marl in the vicinity of test boring B-3 should be expected, and soft to medium stiff clays soils and loose to dense granular soils with the possibility of gravel and possible cobbles should be expected along the remainder of the construction area for trenchless and/or bore and jack method of pipe installation. Groundwater is expected during the trenchless operation (refer to the groundwater levels summarized in Table 1).

b. Placement of the proposed pipes and/or casings may require horizontal directional drilling or bore and heavy-duty jack machines capable of extending the casings into medium stiff lean clays and dense silty sands with the chance of encountering cobbles and/or gravel. Please refer to the attached test borings in Appendix B and Soil Profiles in Appendix D for soil descriptions.

c. Trenchless installation should have minimal effect on surface settlements of the existing roadways and surface features provided that all boreholes are continuously cased during installation. Soil swelling, collapse and/or subsidence could occur if boreholes are left uncased if soft soils within and above the proposed casings are encountered. Also, pumps should be appropriately sized to limit fine soil migration during boring. Excessive pumping and loss of fines may result in settlement of surface supported features.

d. The recommendations contained in this report are based on the results of the soil borings taken at specific locations and at the time designated on the boring logs. It must be noted that soil conditions can vary between boring locations significantly and the nature and extent of these variations may not become evident until the construction is underway. Variation in soil condition between borings should be expected.

G. Backfill Considerations

1. Backfill material should be selected and compacted in accordance with applicable project codes inclusive of local codes, or specifications. Backfill material may consist of INDOT No. 53/No. 73, B borrow, flowable fill or as otherwise directed by the engineer.

2. Backfill materials other than flowable fill should be placed in layers not exceeding 8 inches in loose thickness, with each layer compacted to a minimum of 98 percent of the maximum dry density (MDD) as determined by ASTM D 698 or as otherwise specified by the Engineer.

3. Backfill material should not be placed in a frozen condition or over a frozen subgrade.

4. Soils having Liquid Limit greater than 50 percent, consistency of less than 5 blows per foot, organic matter of more than 3 percent and/or in-place moisture content value of 4 percent above the optimum moisture content shall not be considered for backfilling.

H. Seismic Coefficients

The subsurface conditions at this site meet the requirements for Site Class D based on the 2012 IBC and Table 20.3-1 of 2010 ASCE 7 Chapter 20. Given a Site Class D, and the geographic location of the project site, the design parameters listed below may be used. Additional seismic coefficients, if needed, can found in Appendix E of this report.

Site Class D

$PGA_M = 0.105g$ $S_S = 0.144g$ $S_{DS} = 0.154g$ $S_1 = 0.081g$ $S_{D1} = 0.129g$

V. CONCLUDING REMARKS

The evaluations, conclusions, and recommendations in this report are based on our interpretation of the field and laboratory data obtained during the exploration, information available at the time of this report, our understanding of the project scope at the time of the report and our experience with similar sites and subsurface conditions using generally accepted geotechnical engineering practices. Although individual test borings are representative of the subsurface conditions at the boring locations on the dates drilled, they are not necessarily representative of the subsurface conditions between boring locations or subsurface conditions during other seasons of the year. If the scope of the project changes the recommendations may change and may require additional investigation.

During the design process, it is recommended that CTL work with the project designers to confirm that the geotechnical recommendations are properly incorporated into the final plans and specifications, and to assist with establishing criteria for the construction observation and testing. CTL is not responsible for independent conclusions, opinions and recommendations made by others based on the data and the recommendations provided in this report.

The report was prepared by CTL Engineering, Inc. (Consultant) solely for the use of the Client in accordance with an executed contract. The Client's use of or reliance on this report is limited by the terms and conditions of the contract and by the qualifications and limitations stated in the report. It is also acknowledged that the Client's use of and reliance of this report is limited for reasons which include: actual site conditions that may change with time; hidden conditions, not discoverable within the scope of the assessment, may exist at the site; and the scope of the investigation may have been limited by time, budget and other constraints imposed by the Client.

Neither the report, nor its contents, conclusions nor recommendations are intended for the use of any party other than the Client. Consultant and the Client assume no liability for any reliance placed on this report by such party. The rights of the Client under contract may not be assigned to any person or entity, without the consent of the Consultant which consent shall not be unreasonably withheld.

This geotechnical report does not address the environmental conditions of the site. The Consultant is not responsible for consequences or conditions arising from facts that were concealed, withheld, or not fully disclosed at the time the assessment was conducted.

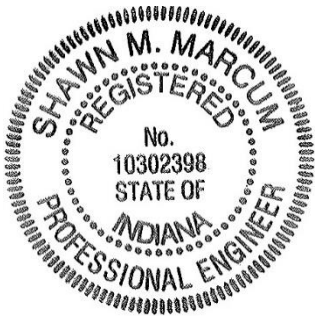
To the fullest extent permitted by law, the Consultant and Client agree to indemnify and hold each other, and their officers and employees harmless from and against claims, damages, losses and expenses arising out of unknown or concealed conditions. Furthermore, neither the Consultant nor its employees shall be liable to the Owner in an amount in excess of the available professional liability insurance coverage of the Consultant. In addition, Client and Consultant agree neither shall be liable for any special, indirect or consequential damages of any kind or nature.

The Consultant's services have been provided consistent with its professional standard of care. No other warranties are made, either expressed or implied.

Sincerely,

CTL ENGINEERING, INC.

Shawn M. Marcum, PE
Senior Project Engineer



Syed Ahmad Husain
Staff Geotechnical Engineer

APPENDIX A

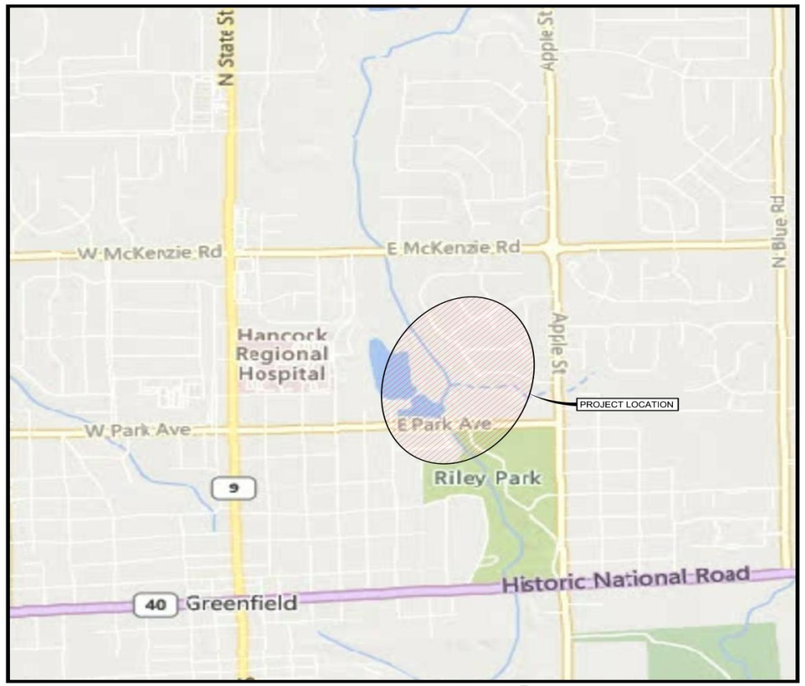
GENERAL LOCATION PLAN
BORING LOCATION PLAN

CITY OF GREENFIELD

PLANS FOR

WATERVIEW
LIFT STATION RELOCATION

PROJECT NO. 2021.02592



PROJECT LOCATION
NOT TO SCALE

PLANS PREPARED FOR:
CITY OF GREENFIELD
809 SOUTH STATE STREET
GREENFIELD, IN 46140

AMERICAN STRUCTUREPOINT INC.
9025 RIVER ROAD, SUITE 200
INDIANAPOLIS, IN 46240
TEL 317.547.5580 FAX 317.543.0270
www.structurepoint.com

BRYAN L. HOOD
PROFESSIONAL ENGINEER No. 11500233
STATE OF INDIANA

60% DESIGN
NOT FOR CONSTRUCTION

PLOT DATE: 11/17/22
PLOT SCALE: 1:1 EDT DATE: 11/9/22 – 10:54 AM EDITED BY: PTRAWINSKI DRAWING FILE: \INDYSANP\PROJECTS\2021\02592\D_DRAWINGS\UTILITY_INFRASTRUCTURE\L2021025921_01_TS.DWG

GENERAL LOCATION PLAN					
Source: American Structurepoint, Inc.		**Date** 6/8/2023	Lift Station Relocation and Sewer Line Greenfield, IN		
CTL ENGINEERING INC	***CTL ENGINEERING, INC.*** GEOTECHNICAL ENGINEERS TESTING * INSPECTION LABORATORY SERVICES	**Scale** None			
		Drawn By SAH	**Reviewed By** SM	**Page** 1 of 1	**Project No.** 23050007IND

LEGEND

Test Borings

BORING LOCATION PLAN

Source: American Structurepoint, Inc.		**Date** 6/8/2023	Lift Station Relocation and Sewer Line Greenfield, IN		
CTL ENGINEERING	***CTL ENGINEERING, INC.*** GEOTECHNICAL ENGINEERS TESTING * INSPECTION LABORATORY SERVICES	**Scale** None			
		Drawn By SAH	**Reviewed By** SM	**Page** 1 of 1	**Project No.** 23050007IND

APPENDIX B

TEST BORING RECORDS

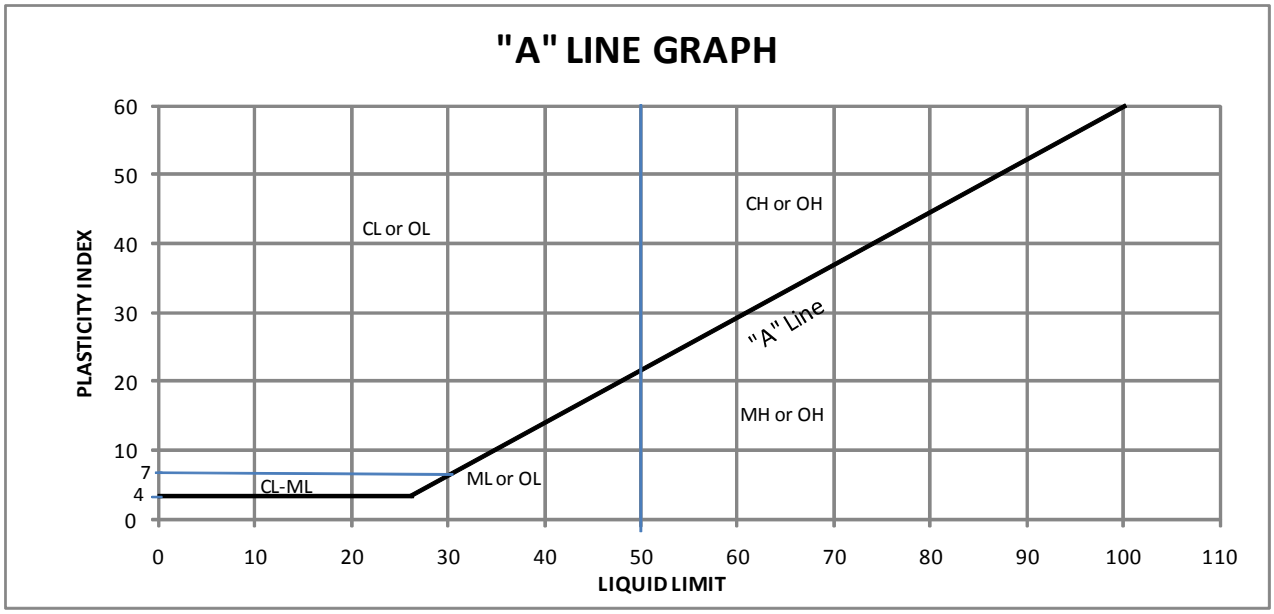
SOIL DESCRIPTIONS BASED ON THE UNIFIED SOIL CLASSIFICATION SYSTEM

ASTM D 2487 and D 2488

Major Division			Group Symbol	Letter Symbol	Group Name*
Coarse Grained Soils Less Than 50 Percent Passing the # 200 Sieve	Gravel - Percent GRAVEL > percent SAND	Gravel with < 5% Fines		GW	Well Graded GRAVEL
				GP	Poorly Graded GRAVEL
		Gravel with Between 5 and 15% Fines		GW-GM	Well Graded GRAVEL with silt
				GW-GC	Well Graded Gravel with clay
				GP-GM	Poorly Graded GRAVEL with silt
				GP-GC	Poorly Graded GRAVEL with clay
		Gravel with ≥ 15% Fines		GM	Silty GRAVEL
				GC	Clayey GRAVEL
	Sand - Percent SAND ≥ percent GRAVEL	Sand with < 5% Fines		SW	Well Graded SAND
				SP	Poorly Graded SAND
		Sand with Between 5 and 15% Fines		SW-SM	Well Graded SAND with silt
				SW-SC	Well Graded SAND with clay
				SP-SM	Poorly Graded SAND with silt
				SP-SC	Poorly Graded SAND with clay
		Sand with ≥ 15% Fines		SM	Silty SAND
				SC	Clayey SAND
Fine Grained Soils 50 percent or more Passing the # 200 Sieve	SILT and CLAY	Liquid Limit Less Than 50		ML	SILT
				CL	Lean CLAY
				CL-ML	SILTY CLAY
				OL	Organic SILT, CLAY, or SILTY CLAY
		Liquid Limit 50 or Greater		MH	Elastic SILT
				CH	Fat CLAY
				OH	Organic SILT or CLAY
Highly Organic Soils				PT	Peat

* Additional Modifiers			
	Coarse Grained Soils	with silt or clay	5 to 12 % Silt or Clay by weight
		Silty or Clayey	more than 12 % Silt or Clay by weight
	Fine Grained Soils	with sand or gravel	15 to 29 % Sand or Gravel by weight
		Sandy or Gravelly	30 % or more Sand or Gravel by weight

"A" LINE GRAPH



SOIL DESCRIPTION

NON-COHESIVE SOIL DESCRIPTION	STANDARD PENETRATION BLOWCOUNTS PER FOOT (BPF)
Very Loose	0 - 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	Over 50

COHESIVE SOIL DESCRIPTION	STANDARD PENETRATION BLOWCOUNTS PER FOOT (BPF)
Very Soft	0 - 1
Soft	2 - 4
Medium Stiff	5 - 8
Stiff	9 - 15
Very Stiff	16 - 30
Hard	Over 30

GRADATION COMPONENT	SIZE
Boulders	Larger than 8"
Cobbles	8" - 3"
Gravel	Passing 3" Retained on #4
Sand	Passing #4 Retained on #200
Silt	0.075 mm to 0.005 mm
Clay	Smaller than 0.005 mm

COMPONENT MODIFIERS	SIZE
Traces	0 - 10%
Little	11 - 20%
Some	21 - 35%
And	36 - 50%

MOISTURE TERMS	DESCRIPTION
Dry	Powdery
Damp	Below Plastic
Moist	Above Plastic Limit & Below Liquid Limit
Wet	Above Liquid Limit

CTL ENGINEERING INC

TEST BORING RECORD

CLIENT : American Structurepoint
PROJECT : Lift Station Relocation and Sewer Line
LOCATION : Greenfield, IN
PROJECT NO. : 23050007IND

BORING NO.: **B-1**
SHEET 1 OF 1
DATE STARTED : 05-12-23
DATE COMPLETED : 05-12-23

Boring Elevation: 871 Feet
Latitude : 39.796166
Longitude -85.760604
Boring Depth : 10.0 Feet
Station:
Offset :
Line :

Boring Method : SFA
Rig Type : CME 75 Truck
Casing Diameter : 4" OD
Core Size : ---

Hammer : Automatic
Hammer Efficiency: 72%
Driller : BV
Temperature : 74° F
Weather : Overcast

GROUNDWATER: ▼ Encountered at 8.5' ▼ At completion 0.1' Caved in at 10.0'

Stratum Elevation	Sample Depth	SOIL/MATERIAL DESCRIPTION	Stratum Depth	Sample Number	SPT per 6"	SPT per 12" (N)	Recovery (%)	Moisture Content (%)	Total Unit Weight (pcf)	Unconfined Compression (ksf)	Atterberg Limits LL	PL	PI
870.4		**CONCRETE** (7.5")	0.6										
869.7		Brown, Moist, Loose, **WELL GRADED SAND with SILT (SW-SM)** with Traces of Clay (Visual)	1.3	SS-1	4 3 4	7	100	24					
868.0		Brown, Moist, Loose, **CLAYEY SAND (SC)** (As Lab 1)	3.0										
	5	Brown, Damp, Medium Dense, **SILTY SAND (SM)** (Lab 2)		SS-2	2 4 8	12	100	18			NP	NP	NP
865.5		Brown, Moist, Medium Dense, **CLAYEY SAND (SC)** (Lab 1)	5.5										
864.0			7.0	SS-3	9 16 18	34	100	10	127.9	2.0 @ 4.5%	30	16	14
		Brown, Damp to Wet, Dense to Medium Dense, **SILTY SAND with GRAVEL (SM)** (Lab 3)		SS-4	6 6 11	17	78	13			NP	NP	NP
861.0	10	**Bottom of Boring at 10 feet**	10.0										
		Boring backfilled according to Aquifer Protection Guidelines											
	15												

CTL ENGINEERING
CTL Engineering, Inc.
Phone: 317-295-8650

BORING METHOD		SAMPLING METHOD		ABBREVIATIONS	
HSA	Hollow Stem Auger	SS	Split Spoon Sample	*	Hand Penetrometer
SFA	Solid Flight Auger	ST	Shelby Tube Sample	LL	Liquid Limit
RC	Rock Coring	CR	Rock Core Sample	PL	Plastic Limit
MD	Mud Drilling	BS	Bag Sample	PI	Plasticity Index
WD	Wash Drilling	AC	Auger Cuttings	SPT	Standard Penetration Test
HA	Hand Auger				

TEST BORING RECORD

CLIENT : American Structurepoint
PROJECT : Lift Station Relocation and Sewer Line
LOCATION : Greenfield, IN
PROJECT NO. : 23050007IND

BORING NO.: **B-2**
SHEET 1 OF 1
DATE STARTED : 05-11-23
DATE COMPLETED : 05-11-23

Boring Elevation: 867 Feet
Latitude : 39.794326
Longitude -85.759086
Boring Depth : 15.0 Feet
Station:
Offset :
Line :

Boring Method : HSA
Rig Type : CME 75 Truck
Casing Diameter : 3.25" ID
Core Size : ---

Hammer : Automatic
Hammer Efficiency: 72%
Driller : BV
Temperature : 82° F
Weather : Sunny

GROUNDWATER: Encountered at 9.0' At completion 6.5' Delayed Reading Dry @ 24Hrs Caved in at 7.5'

Stratum Elevation	Sample Depth	SOIL/MATERIAL DESCRIPTION	Stratum Depth	Sample Number	SPT per 6"	SPT per 12" (N)	Recovery (%)	Moisture Content (%)	Total Unit Weight (pcf)	Unconfined Compression (ksf)	Atterberg Limits LL	PL	PI
866.4		**TOPSOIL** (7")	0.6										
		Brown and Gray, Moist, Soft to Medium Stiff, **SANDY LEAN CLAY (CL)** with Traces of Gravel (As Lab 4)		SS-1	1 2 2	4	78	17					
863.0	5		4.0	SS-2	2 2 4	6	56	6					
				SS-3	1 3 2	5	89	16					
	10	Gray to Brown, Moist to Wet, Loose to Medium Dense, **SILTY SAND (SM)** (As Lab 2)		SS-4	4 8 6	14	67	13					
853.0		Brown, Wet, Medium Dense, **SILTY SAND with GRAVEL (SM)** (As Lab 3)	14.0	SS-5	5 8 8	16	89	12					
852.0	15	**Bottom of Boring at 15 feet**	15.0										
		Boring backfilled according to Aquifer Protection Guidelines											
	20												

CTL Engineering, Inc.
Phone: 317-295-8650

BORING METHOD	SAMPLING METHOD	ABBREVIATIONS
HSA - Hollow Stem Auger	SS - Split Spoon Sample	* - Hand Penetrometer
SFA - Solid Flight Auger	ST - Shelby Tube Sample	LL - Liquid Limit
RC - Rock Coring	CR - Rock Core Sample	PL - Plastic Limit
MD - Mud Drilling	BS - Bag Sample	PI - Plasticity Index
WD - Wash Drilling	AC - Auger Cuttings	SPT - Standard Penetration Test
HA - Hand Auger		

TEST BORING RECORD

CLIENT : American Structurepoint
PROJECT : Lift Station Relocation and Sewer Line
LOCATION : Greenfield, IN
PROJECT NO. : 23050007IND

BORING NO.: **B-3**
SHEET 1 OF 2
DATE STARTED : 05-11-23
DATE COMPLETED : 05-11-23

Boring Elevation: 865 Feet
Latitude : 39.793820
Longitude -85.758721
Boring Depth : 25.0 Feet
Station:
Offset :
Line :

Boring Method : HSA
Rig Type : CME 75 Truck
Casing Diameter : 3.25" ID
Core Size : ---

Hammer : Automatic
Hammer Efficiency: 72%
Driller : BV
Temperature : 73° F
Weather : Sunny

GROUNDWATER: Encountered at 4.0' At completion 3.0' Delayed Reading 5.0 @ 24Hrs Caved in at 5.2'

Stratum Elevation	Sample Depth	SOIL/MATERIAL DESCRIPTION	Stratum Depth	Sample Number	SPT per 6"	SPT per 12" (N)	Recovery (%)	Moisture Content (%)	Total Unit Weight (pcf)	Unconfined Compression (ksf)	Atterberg Limits LL	PL	PI
864.8		**TOPSOIL** (2")	0.2										
		Brown, Moist, Medium Stiff, **SANDY LEAN CLAY (CL)** with Traces of Gravel (Lab 4)		SS-1	2 2 4	6	67	17			31	17	14
862.0			3.0										
		Brown to Dark Gray, Moist, Very Soft to Soft, **SILTY CLAY (CL-ML)** with Little Marl (Visual)		SS-2	0 0 0	0	33	96					
	5	LOI & $CaCO_3$ Test Results on SS-2B Loss on Ignition (LOI) = 13.3% Calcium Carbonate ($CaCO_3$) = 13.6%											
858.5			6.5										
		Black and Brown, Moist, Soft to Medium Stiff, **LEAN CLAY (CL)** with Little Marl and Traces of Gravel (Visual)		SS-3	0 0 2	2	100	155					
856.5			8.5										
	10	LOI & $CaCO_3$ Test Results on SS-3B Loss on Ignition (LOI) = 11.3% Calcium Carbonate ($CaCO_3$) = 27.6%		SS-4	7 8 9	17	100	7					
				ST-1			35						
		Brown and Gray, Wet, Medium Dense, **SILTY SAND (SM)** (As Lab 2)		SS-5	6 9 9	18	100	17					
	15												
845.5			19.5	SS-6	11 12 10	22	100	9			NP	NP	NP
	20	Brown, Moist, Very Stiff, **SANDY SILT (ML) (TILL)** (Lab 5)											

Continued on next page

CTL ENGINEERING
CTL Engineering, Inc.
Phone: 317-295-8650

BORING METHOD		SAMPLING METHOD		ABBREVIATIONS	
HSA	Hollow Stem Auger	SS	Split Spoon Sample	*	Hand Penetrometer
SFA	Solid Flight Auger	ST	Shelby Tube Sample	LL	Liquid Limit
RC	Rock Coring	CR	Rock Core Sample	PL	Plastic Limit
MD	Mud Drilling	BS	Bag Sample	PI	Plasticity Index
WD	Wash Drilling	AC	Auger Cuttings	SPT	Standard Penetration Test
HA	Hand Auger				

TEST BORING RECORD

CLIENT : American Structurepoint

BORING NO.: **B-3**

PROJECT : Lift Station Relocation and Sewer Line

SHEET 2 OF 2

Stratum Elevation	Sample Depth	SOIL/MATERIAL DESCRIPTION	Stratum Depth	Sample Number	SPT per 6"	SPT per 12" (N)	Recovery (%)	Moisture Content (%)	Total Unit Weight (pcf)	Unconfined Compression (ksf)	Atterberg Limits LL	PL	PI
842.0		Brown, Moist, Very Stiff, **SANDY SILT (ML) (TILL)** (Lab 5)	23.0										
840.5		Gray, Wet, Medium Dense, **WELL GRADED SAND with SILT (SW-SM)** (Visual)	24.5	SS-7	11 12	27	100	12					
840.0	25	Gray, Moist, Medium Dense, **CLAYEY SAND (SC)** (Visual)	25.0		15								
		Bottom of Boring at 25 feet											
		Boring backfilled according to Aquifer Protection Guidelines											
	30												
	35												
	40												
	45												

CTL Engineering, Inc.
Phone: 317-295-8650

BORING METHOD		SAMPLING METHOD		ABBREVIATIONS	
HSA	Hollow Stem Auger	SS	Split Spoon Sample	*	Hand Penetrometer
SFA	Solid Flight Auger	ST	Shelby Tube Sample	LL	Liquid Limit
RC	Rock Coring	CR	Rock Core Sample	PL	Plastic Limit
MD	Mud Drilling	BS	Bag Sample	PI	Plasticity Index
WD	Wash Drilling	AC	Auger Cuttings	SPT	Standard Penetration Test
HA	Hand Auger				

TEST BORING RECORD

CLIENT : American Structurepoint
PROJECT : Lift Station Relocation and Sewer Line
LOCATION : Greenfield, IN
PROJECT NO. : 23050007IND

BORING NO.: **B-4**
SHEET 1 OF 2
DATE STARTED : 05-11-23
DATE COMPLETED : 05-11-23

Boring Elevation: 863 Feet
Latitude : 39.792540
Longitude -85.758765
Boring Depth : 25.0 Feet
Station:
Offset :
Line :

Boring Method : HSA
Rig Type : CME 75 Truck
Casing Diameter : 3.25" ID
Core Size : ---

Hammer : Automatic
Hammer Efficiency: 72%
Driller : BV
Temperature : 78° F
Weather : Sunny

GROUNDWATER: Encountered at 4.5' At completion 3.5' Delayed Reading 4.0 @ 24Hrs Caved in at 4.0'

Stratum Elevation	Sample Depth	SOIL/MATERIAL DESCRIPTION	Stratum Depth	Sample Number	SPT per 6"	SPT per 12" (N)	Recovery (%)	Moisture Content (%)	Total Unit Weight (pcf)	Unconfined Compression (ksf)	Atterberg Limits LL	PL	PI
862.5		**TOPSOIL** (6")	0.5										
861.5		Brown, Moist, Soft, **SILTY CLAY (CL-ML)** (Visual)	1.5	SS-1	2 2 2	4	78	24					
	5	Brown, Moist to Wet, Loose, **SILTY SAND (SM)** (As Lab 2)		SS-2	1 1 4	5	78	29					
857.0			6.0										
855.0		Brown, Moist, Dense, **POORLY GRADED GRAVEL with CLAY (GP-GC)** with Traces of Sand (Visual)	8.0	SS-3	18 20 22	42	33	38					
	10			SS-4	8 8 10	18	100	10					
				ST-1			0						
	15	Brown to Gray, Wet, Medium Dense, **SILTY SAND with GRAVEL (SM)** (As Lab 3)		SS-5	14 12 15	27	56	17					
844.0			19.0										
	20	Gray, Moist, Very Stiff, **SANDY SILT (ML)** (As Lab 5)		SS-6	8 12 8	20	100	13					
842.0			21.0										

Continued on next page

CTL ENGINEERING
CTL Engineering, Inc.
Phone: 317-295-8650

BORING METHOD		SAMPLING METHOD		ABBREVIATIONS	
HSA	Hollow Stem Auger	SS	Split Spoon Sample	*	Hand Penetrometer
SFA	Solid Flight Auger	ST	Shelby Tube Sample	LL	Liquid Limit
RC	Rock Coring	CR	Rock Core Sample	PL	Plastic Limit
MD	Mud Drilling	BS	Bag Sample	PI	Plasticity Index
WD	Wash Drilling	AC	Auger Cuttings	SPT	Standard Penetration Test
HA	Hand Auger				

TEST BORING RECORD

CLIENT : American Structurepoint

BORING NO.: **B-4**

PROJECT : Lift Station Relocation and Sewer Line

SHEET 2 OF 2

Stratum Elevation	Sample Depth	SOIL/MATERIAL DESCRIPTION	Stratum Depth	Sample Number	SPT per 6"	SPT per 12" (N)	Recovery (%)	Moisture Content (%)	Total Unit Weight (pcf)	Unconfined Compression (ksf)	Atterberg Limits LL	PL	PI
		Brown, Wet, Medium Dense, **SILTY SAND (SM)** (As Lab 2)		SS-7	6 8 13	21	67	22					
838.0	25	**Bottom of Boring at 25 feet**	25.0										
		Boring backfilled according to Aquifer Protection Guidelines											
	30												
	35												
	40												
	45												

CTL Engineering, Inc.
Phone: 317-295-8650

BORING METHOD		SAMPLING METHOD		ABBREVIATIONS	
HSA	Hollow Stem Auger	SS	Split Spoon Sample	*	Hand Penetrometer
SFA	Solid Flight Auger	ST	Shelby Tube Sample	LL	Liquid Limit
RC	Rock Coring	CR	Rock Core Sample	PL	Plastic Limit
MD	Mud Drilling	BS	Bag Sample	PI	Plasticity Index
WD	Wash Drilling	AC	Auger Cuttings	SPT	Standard Penetration Test
HA	Hand Auger				

TEST BORING RECORD

CLIENT : American Structurepoint
PROJECT : Lift Station Relocation and Sewer Line
LOCATION : Greenfield, IN
PROJECT NO. : 23050007IND

BORING NO.: **B-5**
SHEET 1 OF 1
DATE STARTED : 05-12-23
DATE COMPLETED : 05-12-23

Boring Elevation: 863 Feet
Latitude : 39.792452
Longitude -85.759650
Boring Depth : 15.0 Feet
Station:
Offset :
Line :

Boring Method : SFA
Rig Type : CME 75 Truck
Casing Diameter : 4" OD
Core Size : ---

Hammer : Automatic
Hammer Efficiency: 72%
Driller : BV
Temperature : 70° F
Weather : Overcast

GROUNDWATER: ▼ Encountered at 6.0' ▼ At completion 5.5' Caved in at 11.0'

Stratum Elevation	Sample Depth	SOIL/MATERIAL DESCRIPTION	Stratum Depth	Sample Number	SPT per 6"	SPT per 12" (N)	Recovery (%)	Moisture Content (%)	Total Unit Weight (pcf)	Unconfined Compression (ksf)	Atterberg Limits LL	PL	PI
862.1		**ASPHALT** (11")	0.9										
		Brown and Dark Gray, Moist, Medium Dense, **SILTY SAND with GRAVEL (SM) (FILL)** (Visual)		SS-1	7 12 5	17	56	12					
860.5			2.5										
		Brown, Damp, Loose, **SILTY SAND (SM)** (As Lab 2)		SS-2	2 3 3	6	17	14					
	5												
857.0 ▼			6.0										
		Brown and Gray, Moist, Soft, **SILTY CLAY (CL-ML)** (Visual)		SS-3	1 2 2	4	67	34					
855.0			8.0										
		Gray and Dark Gray, Moist, Very Loose, **POORLY GRADED SAND with CLAY (SP-SC)** (Visual)		SS-4	1 2 1	3	89	22					
	10												
852.5			10.5										
		Brown, Wet, Medium Dense, **SILTY SAND with GRAVEL (SM)** (As Lab 3)		SS-5	6 11 11	22	100	13					
848.0	15		15.0										
		Bottom of Boring at 15 feet											
		Boring backfilled according to Aquifer Protection Guidelines											
	20												

CTL ENGINEERING

CTL Engineering, Inc.
Phone: 317-295-8650

BORING METHOD		SAMPLING METHOD		ABBREVIATIONS	
HSA	Hollow Stem Auger	SS	Split Spoon Sample	*	Hand Penetrometer
SFA	Solid Flight Auger	ST	Shelby Tube Sample	LL	Liquid Limit
RC	Rock Coring	CR	Rock Core Sample	PL	Plastic Limit
MD	Mud Drilling	BS	Bag Sample	PI	Plasticity Index
WD	Wash Drilling	AC	Auger Cuttings	SPT	Standard Penetration Test
HA	Hand Auger				

TEST BORING RECORD

CLIENT : American Structurepoint
PROJECT : Lift Station Relocation and Sewer Line
LOCATION : Greenfield, IN
PROJECT NO. : 23050007IND

BORING NO.: **B-6**
SHEET 1 OF 1
DATE STARTED : 05-12-23
DATE COMPLETED : 05-12-23

Boring Elevation: 866 Feet
Latitude : 39.792437
Longitude -85.761306
Boring Depth : 15.0 Feet
Station:
Offset :
Line :

Boring Method : SFA
Rig Type : CME 75 Truck
Casing Diameter : 4" OD
Core Size : ---

Hammer : Automatic
Hammer Efficiency: 72%
Driller : BV
Temperature : 72° F
Weather : Overcast

GROUNDWATER: ▼ Encountered at 6.5' ▼ At completion Dry ▨ Caved in at 4.0'

Stratum Elevation	Sample Depth	SOIL/MATERIAL DESCRIPTION	Stratum Depth	Sample Number	SPT per 6"	SPT per 12" (N)	Recovery (%)	Moisture Content (%)	Total Unit Weight (pcf)	Unconfined Compression (ksf)	Atterberg Limits LL	PL	PI
865.0		**ASPHALT** (12")	1.0										
864.5		Brown, Moist, Very Loose, **SILTY SAND with GRAVEL (SM) (FILL)** (Visual)	1.5	SS-1	3 1 2	3	67	9					
863.0		Gray, Moist, Soft, **LEAN CLAY (CL)** (Visual)	3.0										
	5	Brown, Moist, Hard, **SANDY LEAN CLAY (CL)** with Little Gravel (As Lab 4)		SS-2	9 34 40	74	67	18					
860.5			5.5										
				SS-3	5 11 6	17	67	10					
	10	Brown, Wet, Medium Dense to Loose, **SILTY SAND with GRAVEL (SM)** (As Lab 3)		SS-4	5 8 5	13	100	13					
				SS-5	1 2 4	6	33	15					
851.0	15	**Bottom of Boring at 15 feet**	15.0										
		Boring backfilled according to Aquifer Protection Guidelines											
	20												

CTL ENGINEERING

CTL Engineering, Inc.
Phone: 317-295-8650

BORING METHOD		SAMPLING METHOD		ABBREVIATIONS	
HSA	Hollow Stem Auger	SS	Split Spoon Sample	*	Hand Penetrometer
SFA	Solid Flight Auger	ST	Shelby Tube Sample	LL	Liquid Limit
RC	Rock Coring	CR	Rock Core Sample	PL	Plastic Limit
MD	Mud Drilling	BS	Bag Sample	PI	Plasticity Index
WD	Wash Drilling	AC	Auger Cuttings	SPT	Standard Penetration Test
HA	Hand Auger				

APPENDIX C

LABORATORY TESTING

Summary of Classification Test Results
Grain Size Distribution Curves
Unconfined Compressive Strength Test Results
Summary of Special Laboratory Test Results

Lab No.	Boring No.	Latitude	Longitude	Sample No.	Depth	Soil Classification	ASTM Group	Grain Size Distribution (%)				WC	LL	PL	PI	Max. Dry Density (pcf)	Optimum Moisture Content (%)	CBR (%)		
								Gravel	Sand	Silt	Clay							90%	95%	100%
Lab 1	B-1	39.796166	-85.760604	SS-3	6.0-7.5	CLAYEY SAND	SC	4.7	62.4	17.5	15.4	10	30	16	14					
Lab 2	B-1	39.796166	-85.760604	SS-2	3.5-5.0	SILTY SAND	SM	9.9	71.8	17.4	0.9	18	NP	NP	NP					
Lab 3	B-1	39.796166	-85.760604	SS-4	8.5-10.0	SILTY SAND with GRAVEL	SM	30.0	56.7	11.5	1.8	13	NP	NP	NP					
Lab 4	B-3	39.793820	-85.758721	SS-1	0.5-2.0	SANDY LEAN CLAY	CL	1.6	28.9	44.1	25.5	17	31	17	14					
Lab 5	B-3	39.793820	-85.758721	SS-6	18.5-20.0	SANDY SILT	ML	3.0	46.9	42.0	8.1	9	NP	NP	NP					

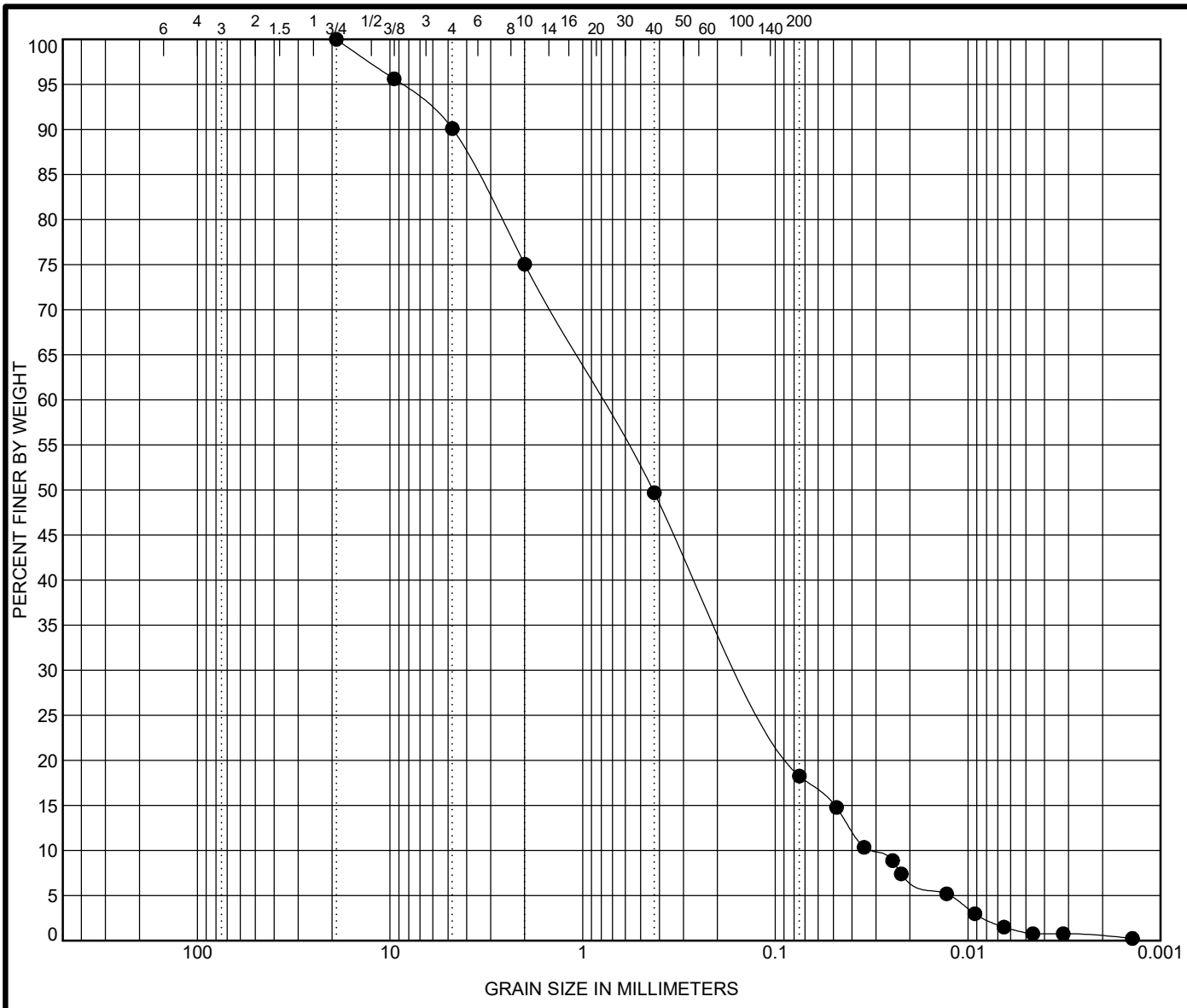
CTL ENGINEERING
CTL Engineering, Inc.
Phone: 317-295-8650

SUMMARY OF CLASSIFICATION TEST RESULTS

Project: Lift Station Relocation and Sewer Line

Location: Greenfield, IN

Project No.: 23050007IND



COBBLES	GRAVEL		SAND			SILT OR CLAY
	Coarse	Fine	Coarse	Medium	Fine	

Boring No.	B-1	Classification	MC	LL	PL	PI	Cc	Cu
Sample	SS-2	SILTY SAND	18.3	NP	NP	NP	0.81	25.02
Depth	3.5-5.0	SM						
Latitude	39.796166	Lab 2						
Longitude	-85.760604							

Fine material soaking time	Minutes	D100	D60	D50	D30	D10	%Gravel	%Sand	%Silt	%Clay
		19	0.798	0.433	0.143	0.032	9.9	71.8	17.4	0.9

Remarks

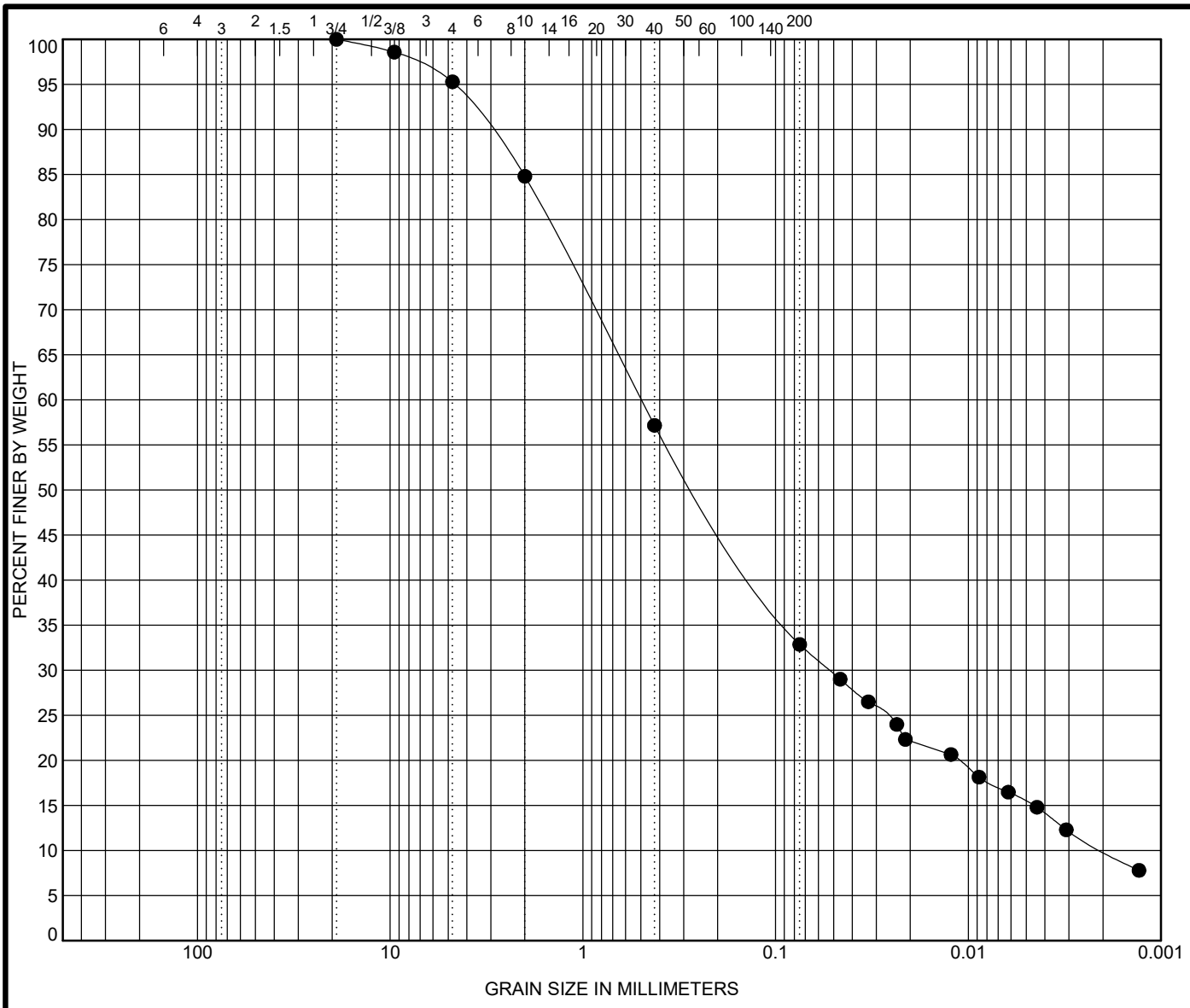
CTL ENGINEERING
CTL Engineering, Inc.
Phone: 317-295-8650

GRAIN SIZE DISTRIBUTION

Project: Lift Station Relocation and Sewer Line

Location: Greenfield, IN

CTL Project No.: 23050007IND



COBBLES	GRAVEL		SAND			SILT OR CLAY
	Coarse	Fine	Coarse	Medium	Fine	

Boring No.	B-1	Classification	MC	LL	PL	PI	Cc	Cu
Sample	SS-3	CLAYEY SAND	10.5	30	16	14	2.76	250.36
Depth	6.0-7.5	SC						
Latitude	39.796166	Lab 1						
Longitude	-85.760604							

Fine material soaking time	Minutes	D100	D60	D50	D30	D10	%Gravel	%Sand	%Silt	%Clay
		19	0.498	0.255	0.052	0.002	4.7	62.4	17.5	15.4

Remarks

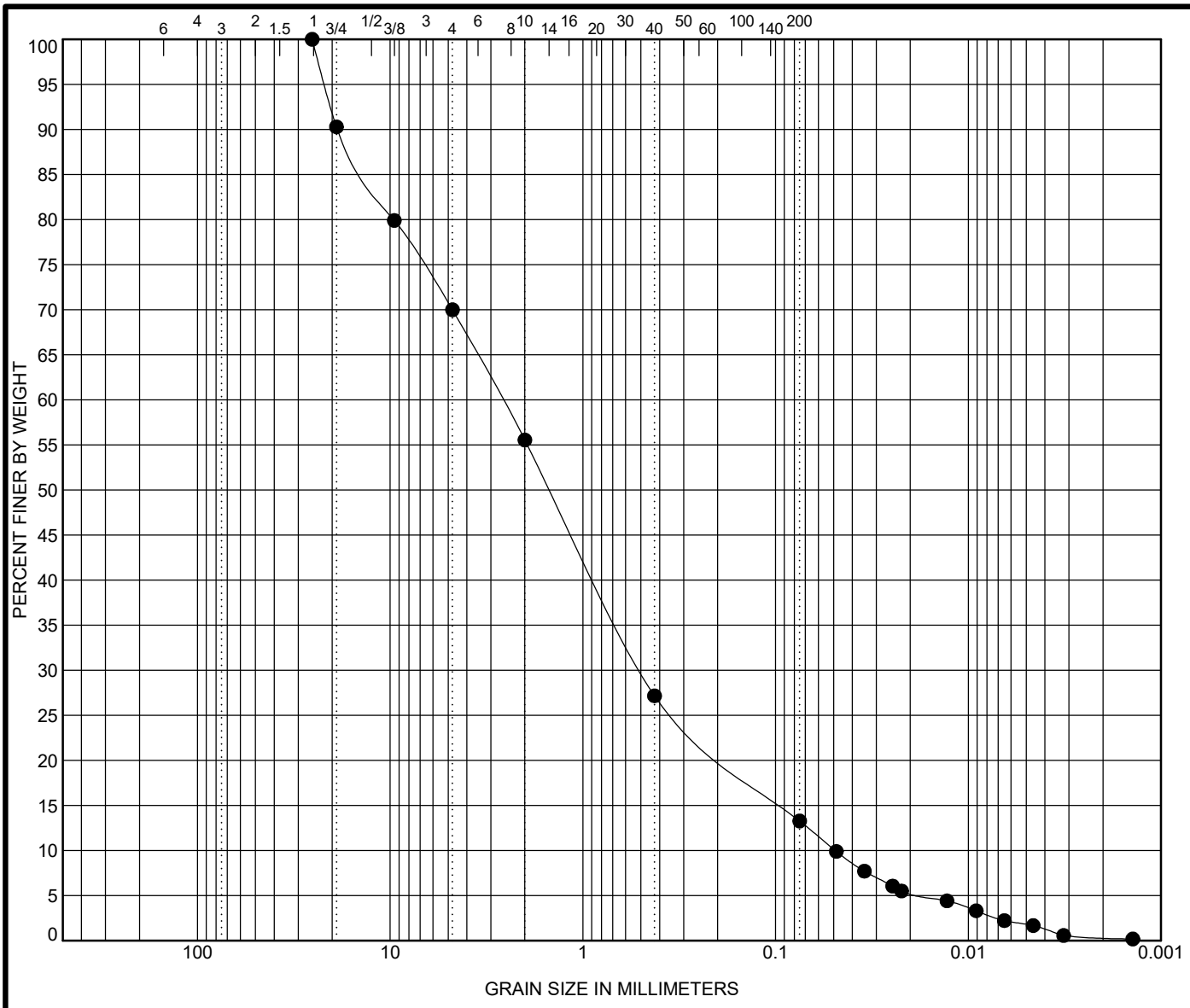
CTL Engineering, Inc.
Phone: 317-295-8650

GRAIN SIZE DISTRIBUTION

Project: Lift Station Relocation and Sewer Line

Location: Greenfield, IN

CTL Project No.: 23050007IND



COBBLES	GRAVEL		SAND			SILT OR CLAY
	Coarse	Fine	Coarse	Medium	Fine	

Boring No.	B-1	Classification	MC	LL	PL	PI	Cc	Cu
Sample	SS-4	**SILTY SAND with GRAVEL**	**12.9**	**NP**	**NP**	**NP**	**1.92**	**53.23**
Depth	**8.5-10.0**	**SM**						
Latitude	**39.796166**	**Lab 3**						
Longitude	**-85.760604**							

Fine material soaking time	Minutes	D100	D60	D50	D30	D10	%Gravel	%Sand	%Silt	%Clay
		25.4	**2.611**	**1.478**	**0.496**	**0.049**	**30.0**	**56.7**	**11.4**	**1.8**

Remarks

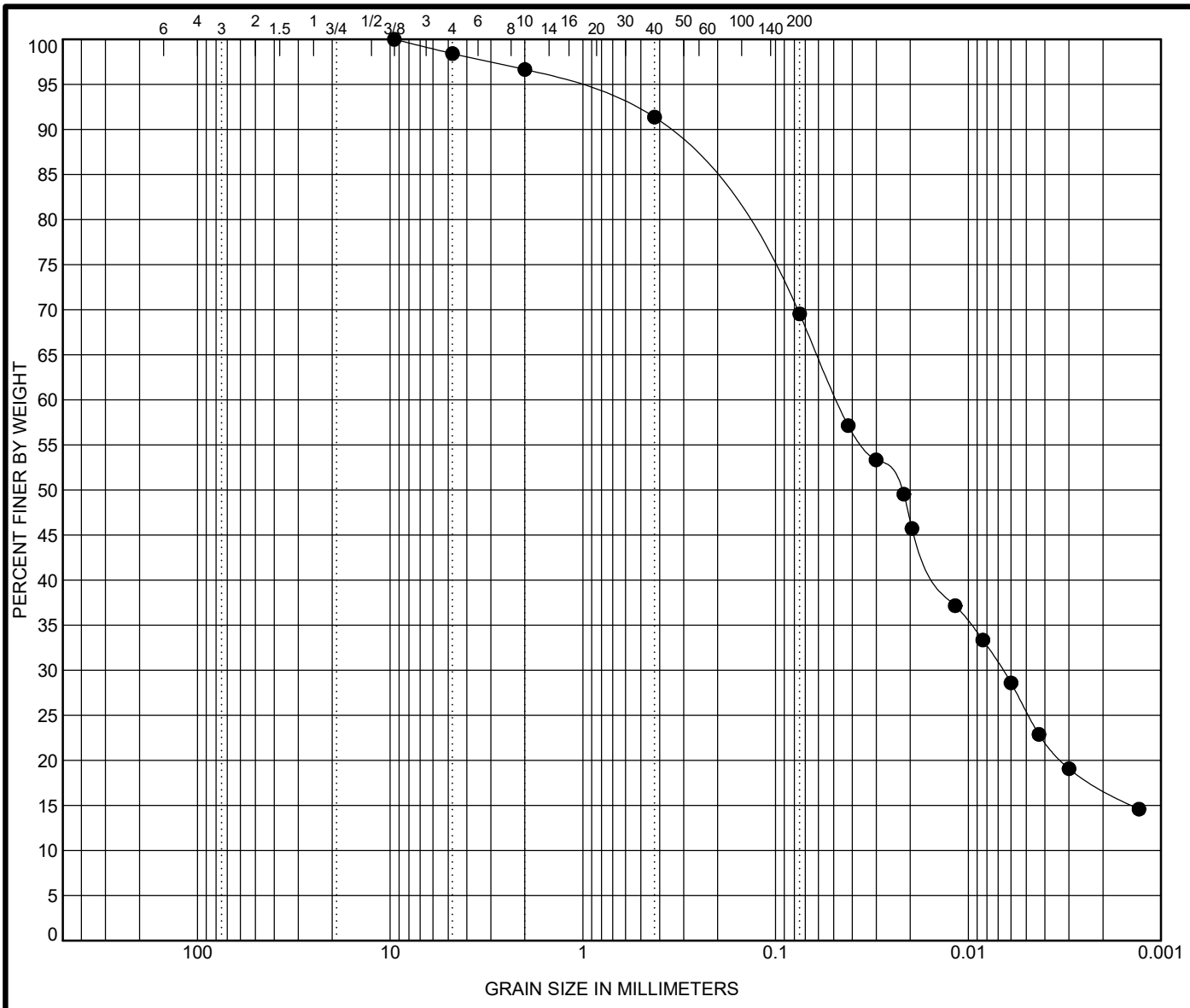
CTL Engineering, Inc.
Phone: 317-295-8650

GRAIN SIZE DISTRIBUTION

Project: Lift Station Relocation and Sewer Line

Location: Greenfield, IN

CTL Project No.: 23050007IND



COBBLES	GRAVEL		SAND			SILT OR CLAY
	Coarse	Fine	Coarse	Medium	Fine	

Boring No.	B-3	Classification	MC	LL	PL	PI	Cc	Cu
Sample	SS-1	SANDY LEAN CLAY	16.7	31	17	14		
Depth	0.5-2.0	CL						
Latitude	39.793820	Lab 4						
Longitude	-85.758721							

Fine material soaking time	Minutes	D100	D60	D50	D30	D10	%Gravel	%Sand	%Silt	%Clay
		9.525	0.048	0.023	0.007		1.6	28.9	44.1	25.5

Remarks

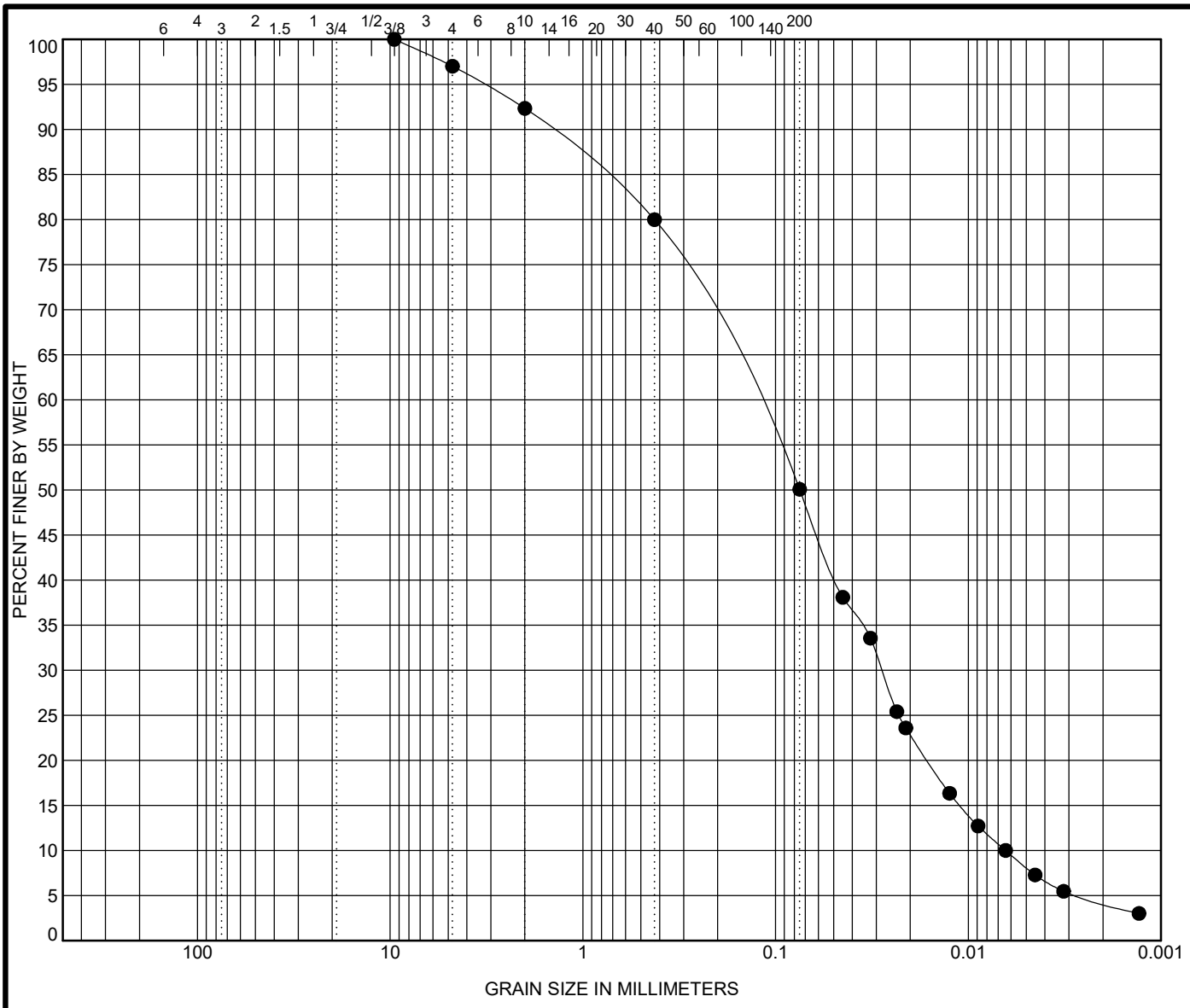
CTL Engineering, Inc.
Phone: 317-295-8650

GRAIN SIZE DISTRIBUTION

Project: Lift Station Relocation and Sewer Line

Location: Greenfield, IN

CTL Project No.: 23050007IND



COBBLES	GRAVEL		SAND			SILT OR CLAY
	Coarse	Fine	Coarse	Medium	Fine	

Boring No.	B-3	Classification	MC	LL	PL	PI	Cc	Cu
Sample	SS-6	SANDY SILT	9.4	NP	NP	NP	0.92	20.85
Depth	18.5-20.0	ML						
Latitude	39.793820	Lab 5						
Longitude	-85.758721							

Fine material soaking time	Minutes	D100	D60	D50	D30	D10	%Gravel	%Sand	%Silt	%Clay
		9.525	0.133	0.075	0.028	0.006	3.0	46.9	41.9	8.1

Remarks

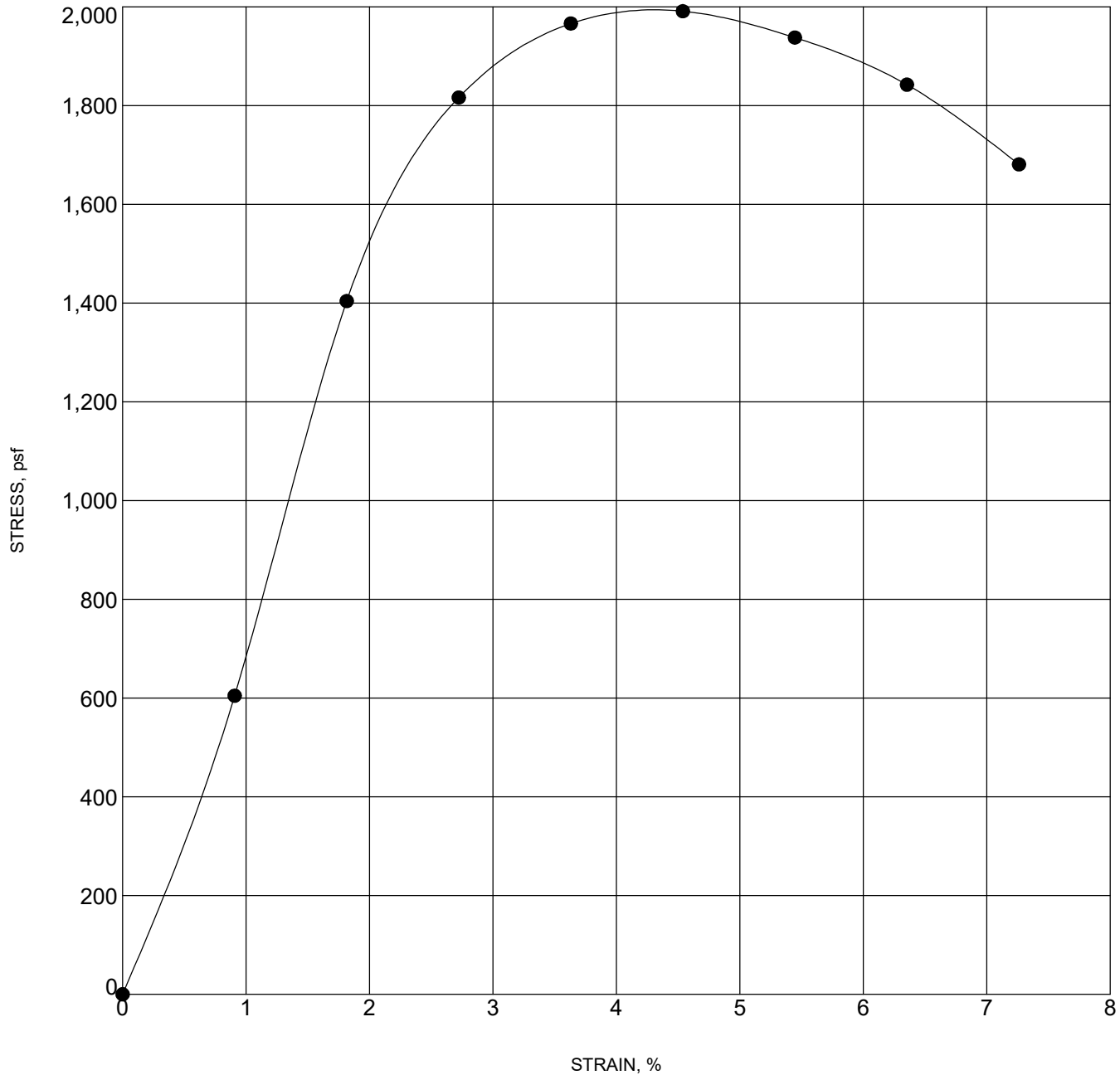
CTL Engineering, Inc.
Phone: 317-295-8650

GRAIN SIZE DISTRIBUTION

Project: Lift Station Relocation and Sewer Line

Location: Greenfield, IN

CTL Project No.: 23050007IND



Boring Information		Test Results	
Boring No.	**B-1**	Natural Moisture Content (%)	**15.5**
Sample	**SS-3**	Natural Wet Density, pcf	**127.9**
Depth	**6.0 - 7.5**	Natural Dry Density, pcf	**110.7**
Latitude	**39.796166**	Unconfined Compression Strength, psf	**1991**
Longitude	**-85.760604**	Failure Strain (%)	**4.5**
		SOIL DESCRIPTION	**CLAYEY SAND (SC)**

CTL Engineering, Inc.
Phone: 317-295-8650

UNCONFINED COMPRESSIVE STRENGTH

Project: Lift Station Relocation and Sewer Line

Location: Greenfield, IN

Project No.: 23050007IND

Boring No.	Latitude	Longitude	Sample No.	Depth	Moisture Content (%)	Wet Density (pcf)	Dry Density (pcf)	Unconfined Compression (psf)	Failure Strain (%)	Loss on Ignition (%)	Calcium Carbonate (%)	pH
B-1	39.796166	-85.760604	SS-1	0.7-2.2	23.7							
B-1	39.796166	-85.760604	SS-2	3.5-5.0	18.3							6.5
B-1	39.796166	-85.760604	SS-3	6.0-7.5	10.5	127.9	110.7	1991	4.5			7.0
B-1	39.796166	-85.760604	SS-4	8.5-10.0	12.9							6.5
B-2	39.794326	-85.759086	SS-1	0.5-2.0	16.8							
B-2	39.794326	-85.759086	SS-2	3.5-5.0	5.7							
B-2	39.794326	-85.759086	SS-3	6.0-7.5	16.4							
B-2	39.794326	-85.759086	SS-4	8.5-10.0	13.0							
B-2	39.794326	-85.759086	SS-5	13.5-15.0	12.5							
B-3	39.793820	-85.758721	SS-1	0.5-2.0	16.7							7.1
B-3	39.793820	-85.758721	SS-2	3.5-5.0	95.6					13.3	13.6	
B-3	39.793820	-85.758721	SS-3	6.0-7.5	155.0					11.3	27.6	
B-3	39.793820	-85.758721	SS-4	8.5-10.0	7.3							
B-3	39.793820	-85.758721	SS-5	13.5-15.0	17.3							
B-3	39.793820	-85.758721	SS-6	18.5-20.0	9.4							6.3
B-3	39.793820	-85.758721	SS-7	23.5-25.0	11.7							
B-4	39.792540	-85.758765	SS-1	0.5-2.0	23.6							
B-4	39.792540	-85.758765	SS-2	3.5-5.0	28.9							
B-4	39.792540	-85.758765	SS-3	6.0-7.5	37.5					2.5	14.5	
B-4	39.792540	-85.758765	SS-4	8.5-10.0	10.4							
B-4	39.792540	-85.758765	SS-5	13.5-15.0	16.7							
B-4	39.792540	-85.758765	SS-6	18.5-20.0	12.8							
B-4	39.792540	-85.758765	SS-7	23.5-25.0	22.2							
B-5	39.792452	-85.759650	SS-1	1.0-2.5	11.7							
B-5	39.792452	-85.759650	SS-2	3.5-5.0	14.1							
B-5	39.792452	-85.759650	SS-3	6.0-7.5	33.8					2.5	6.5	
B-5	39.792452	-85.759650	SS-4	8.5-10.0	22.1							
B-5	39.792452	-85.759650	SS-5	13.5-15.0	13.3							
B-6	39.792437	-85.761306	SS-1	1.0-2.5	8.9							
B-6	39.792437	-85.761306	SS-2	3.5-5.0	18.3							
B-6	39.792437	-85.761306	SS-3	6.0-7.5	10.5							
B-6	39.792437	-85.761306	SS-4	8.5-10.0	12.9							
B-6	39.792437	-85.761306	SS-5	13.5-15.0	15.5							

CTL ENGINEERING
CTL Engineering, Inc.
Phone: 317-295-8650

SUMMARY OF SPECIAL LABORATORY TEST RESULTS

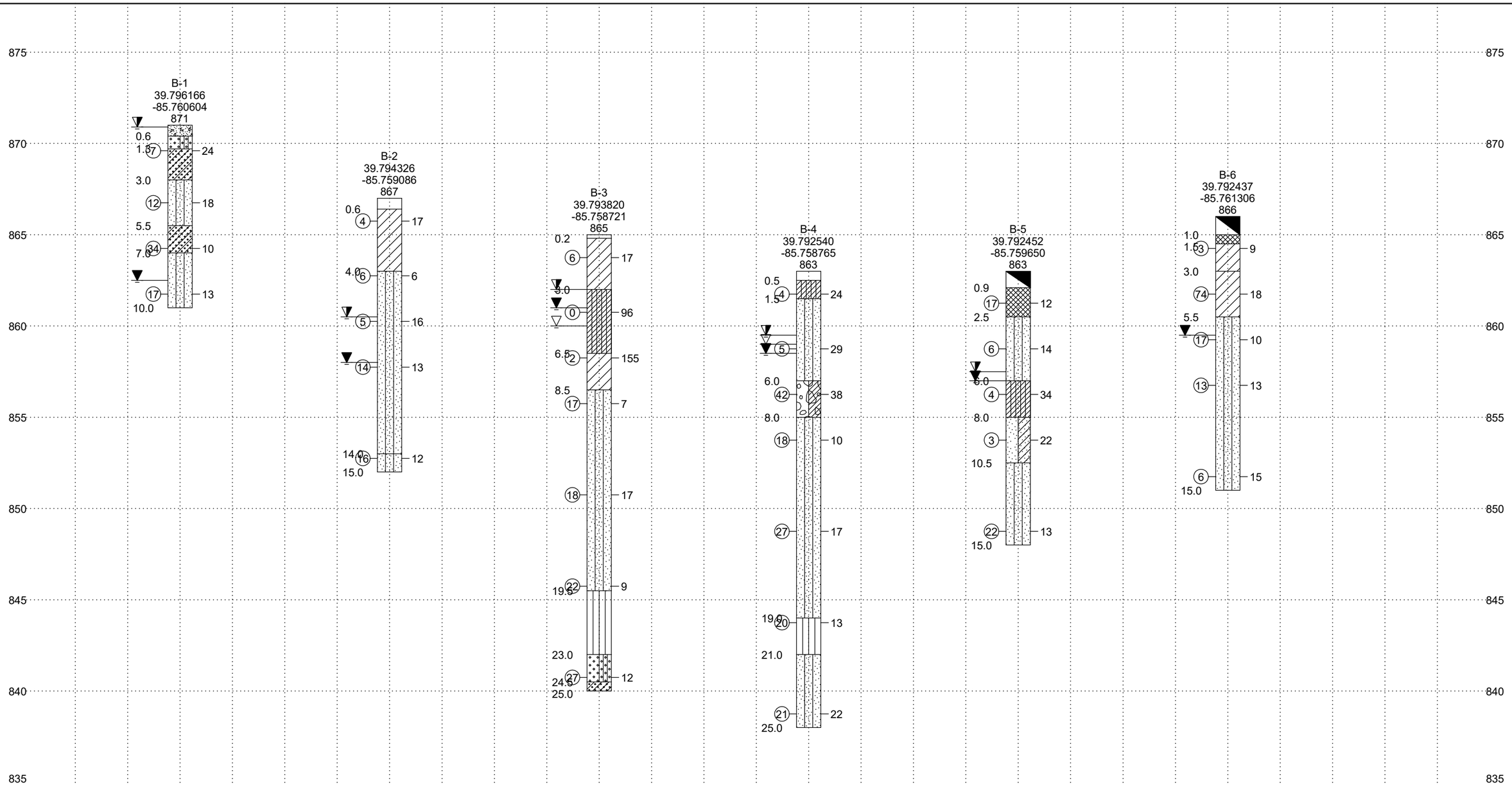
Project: Lift Station Relocation and Sewer Line

Location: Greenfield, IN

CTL Project No.: 23050007IND

APPENDIX D

SOIL PROFILES



CTL Engineering, Inc.
1310 S. Franklin Rd.
Indianapolis, Indiana 46239
Phone: 317-295-8650
Website: www.ctleng.com

LEGEND

- CONCRETE
- SILTY SAND
- SILTY CLAY
- ASPHALT CONCRETE
- SAND WITH SILT_WELL GRADED
- TOPSOIL
- SILT
- FILL
- CLAYEY SAND
- LEAN CLAY
- GRAVEL WITH CLAY_POORLY GRADED
- SAND WITH CLAY_POORLY GRADED

GROUND WATER DURING DRILLING
GROUND WATER AT COMPLETION OF DRILLING
GROUND WATER AT "N" HOURS AFTER COMPLETION

W — MOISTURE CONTENT IN PERCENT (w)

(N) — STANDARD PENETRATION IN BLOWS PER FOOT (N)

SOIL PROFILE

Scale: As Shown	American Structurepoint
Date: 6/8/23	Lift Station Relocation and Sewer Line
Drawn By: CG	Greenfield, IN
Reviewed By	Project No. 23050007IND / Page 1 of 1

APPENDIX E

SEISMIC COEFFICIENTS

Lift Station Relocation and Sewer Line

Latitude, Longitude: 39.793820, -85.758721

Date	6/7/2023, 9:56:50 AM
Design Code Reference Document	ASCE7-10
Risk Category	II
Site Class	D - Stiff Soil

Type	Value	Description
S_S	0.144	MCE_R ground motion. (for 0.2 second period)
S_1	0.081	MCE_R ground motion. (for 1.0s period)
S_{MS}	0.231	Site-modified spectral acceleration value
S_{M1}	0.194	Site-modified spectral acceleration value
S_{DS}	0.154	Numeric seismic design value at 0.2 second SA
S_{D1}	0.129	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	B	Seismic design category
F_a	1.6	Site amplification factor at 0.2 second
F_v	2.4	Site amplification factor at 1.0 second
PGA	0.066	MCE_G peak ground acceleration
F_{PGA}	1.6	Site amplification factor at PGA
PGA_M	0.105	Site modified peak ground acceleration
T_L	12	Long-period transition period in seconds
SsRT	0.144	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	0.159	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.5	Factored deterministic acceleration value. (0.2 second)
S1RT	0.081	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.093	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.6	Factored deterministic acceleration value. (1.0 second)
PGAd	0.5	Factored deterministic acceleration value. (Peak Ground Acceleration)
PGA_{UH}	0.066	Uniform-hazard (2% probability of exceedance in 50 years) Peak Ground Acceleration
C_{RS}	0.911	Mapped value of the risk coefficient at short periods
C_{R1}	0.867	Mapped value of the risk coefficient at a period of 1 s
C_V		Vertical coefficient

DISCLAIMER

While the information presented on this website is believed to be correct, SEAOC /OSHPD and its sponsors and contributors assume no responsibility or liability for its accuracy. The material presented in this web application should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other licensed professionals. SEAOC / OSHPD do not intend that the use of this information replace the sound judgment of such competent professionals, having experience and knowledge in the field of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the results of the seismic data provided by this website. Users of the information from this website assume all liability arising from such use. Use of the output of this website does not imply approval by the governing building code bodies responsible for building code approval and interpretation for the building site described by latitude/longitude location in the search results of this website.

PERPETUAL EXCLUSIVE UTILITY EASEMENT

THIS INDENTURE WITNESSETH that the Hancock County 4-H Club Agricultural Association, Inc., hereinafter referred to as "GRANTOR", for valuable consideration in the amount of Seven Thousand Dollars ($7,000.00), hereby grants and conveys to the City of Greenfield, of Hancock County, Indiana, hereinafter referred to as "GRANTEE", a perpetual exclusive easement together with all devices and appurtenances necessary for the proper construction or operation of its utilities, across and under the surface of the following described real estate located in Hancock County, State of Indiana, to wit:

Described on Exhibit A and depicted on Exhibit B
as well as described and depicted on Exhibit C

Containing in total 0.447 acres, more or less.

It is further understood and agreed that any installations constructed on said easement shall be and remain the property of the GRANTEE.

It is further understood and agreed that GRANTEE shall have the right to unimpeded ingress and egress for the purpose of maintaining and operating any such installations constructed on said easement and said GRANTEE shall hold GRANTOR harmless from damage occasioned by the operation or maintenance of said installations within said easement as to any claims, judgments, or damages to third parties only.

It is further understood and agreed that no buildings, improvements or obstacles shall be placed or be permitted to remain on said easement without the consent of GRANTEE, with the exception that Grantee consents to Grantor's use and maintenance of the existing parking lot over the sewer line portion of the easement, to be used for parking for Grantor's events.

GRANTOR states that it is the owner of the above-described premises. This Perpetual Exclusive Sewer Agreement shall be subject to the following terms and conditions:

1. Work on this project will not commence until August 1, 2024 or later.

2. At all times during the construction, the western gate access to the Grantor's parking area shall remain open and accessible.

BOW 5-14-24
APPROVED

3. That portion of the easement which must be open cut for the installation of the sewer main will be continually worked on from day to day from beginning to completion weather permitting.

4. That portion of the easement into which the sewer main is to be installed will be compacted in layers so as to minimize settling of the earth above the sewer main.

5. Upon completion of the installation of the sewer main, Grantee's contractor and/or the Grantee shall take all steps necessary to ensure that the open cut area remains properly compacted and suitable for vehicular traffic, horses and ponies, as well as pedestrians to cross.

6. Grantee shall construct the project in such a fashion so that by March 2025, the area in which the sewer main is located will be available for weekly horse practices.

7. Grantee's contractor shall follow all state and local laws and ordinances with regard to the installation and maintenance of traffic barriers when work is being conducted along Park Avenue, both for the lift station as well as force main construction.

8. There will not be any work conducted on the project during the week of Riley Days.

9. Grantee shall inform Grantor in advance of the date(s) when the boring process under Park Avenue shall take place.

10. Grantee will consult and coordinate with Grantor regarding fencing and roof colors for the lift station and its enclosure.

11. Grantee will ensure that within Grantee's contract with its contractor, there shall be stated an intermediate completion date, substantial completion date and final completion date with said dates being transmitted to the Grantor.

12. Grantee commits that its contractor will be required to submit a three-year maintenance bond upon acceptance of the infrastructure improvements which will provide for maintenance of the open cut area that is a portion of the subject easement and that thereafter, maintenance of said area will be performed by Grantee as needed.

13. Grantee, through the Greenfield Water Utility, will replace the currently existing three-quarter inch water line from the water main bordering Park Avenue by providing a two (2)

inch tap for a two (2) inch gate valve to act as the City-owned control valve, installation of a two (2) inch line from the gate valve to Grantor's property line, a distance of twenty (20) feet from the water main at no cost to the Grantor. In addition, the Greenfield Water Utility will provide at no cost to Grantor a two (2) inch water meter which shall be installed by Grantor at Grantor's expense in accordance with the installation procedures and requirements of the Greenfield Water Utility. The Grantor will then be responsible for building the portion of the two (2) inch water line from the meter to its desired point of termination. In addition, Grantor will be required to purchase and install a two (2) inch backflow prevention device along the with the installation of a meter structure that will be properly heated to protect the two (2) inch meter setting and the two (2) inch backflow prevention device. Any further extensions of the two (2) inch water line on the Grantor's property will be at the Grantor's expense.

14. Grantee will install a manhole on the south side of Park Avenue, directly across the street from the proposed lift station, and a manhole on the north side of Park Avenue, as shown on the conceptual plans provided by the Grantee, for a total of two manholes, into which Grantor may have access for a future sewer connection subject to the then prevailing fees and costs.

The provisions hereof shall be binding upon the successors, assigns, and legal representatives of the parties hereto.

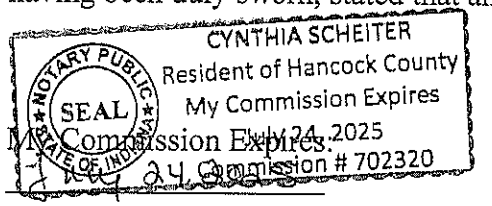
IN WITNESS WHEREOF, GRANTOR has executed this easement this 14th day of May, 2024.

Signature: Michael A Elsbury PRESIDENT
Hancock County 4-H Club Agricultural Association, Inc.
By: PRESIDENT HANCOCK COUNTY 4-H AG. ASSOC.

STATE OF INDIANA)
) SS:
COUNTY OF HANCOCK)

Before me, a Notary Public in and for said County and State, personally appeared Michael Elsbury, President of the Hancock County 4-H Club Agricultural Association, Inc. who

acknowledged the execution of the foregoing Perpetual Exclusive Utility Easement and who, having been duly sworn, stated that any representations therein contained are true.



My Commission Expires: July 24, 2025

Cynthia Scheiter, Notary Public
Residing in Hancock County, IN

GRANTEE has caused this instrument to be executed in its corporate capacity by its duly qualified Board of Public Works and Safety of the City of Greenfield and as such is empowered to accept the above and foregoing Perpetual Exclusive Utility Easement.

Guy Titus, Mayor

Larry J. Breese, Member

Brent Robertson, Member

Katherine N. Locke, Member

Glenna Shelby, Member

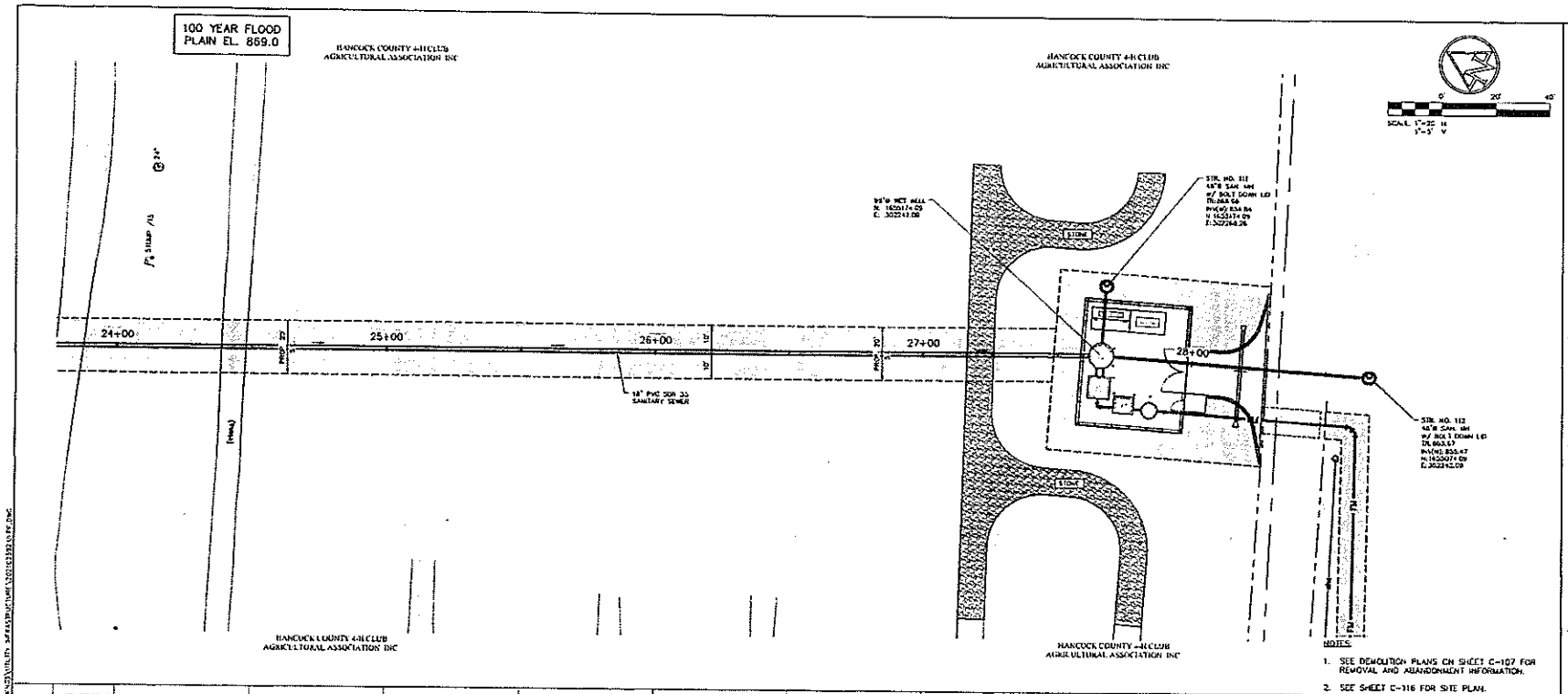
ATTEST:

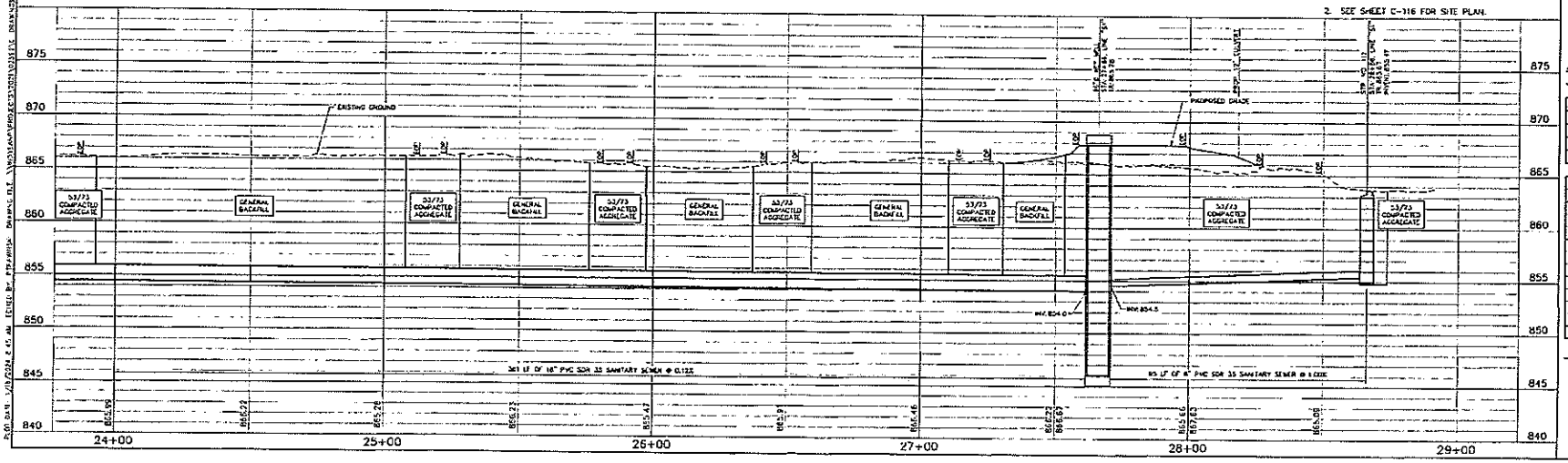
Lori Elmore, Clerk Treasurer

SEND TAX BILLS TO: City of Greenfield, P.O. Box 456, Greenfield, IN 46140.
RETURN EASEMENT TO: City of Greenfield, P.O. Box 456, Greenfield, IN 46140.

This instrument prepared by: Gregg H. Morelock, BRAND & MORELOCK, 6 W. South St., Greenfield, Indiana, 46140.

I affirm, under the penalties for perjury, that I have taken reasonable care to redact each social security number in this document, unless required by law. Gregg H. Morelock





CITY OF GREENFIELD

AMERICAN STRUCTUREPOINT INC

WATERVIEW LIFT STATION RELOCATION

Greenfield, Indiana

REGISTERED PROFESSIONAL ENGINEER No. 11500233 STATE OF INDIANA

Bryan L. Hoelscher 1/12/2024
CERTIFIED BY

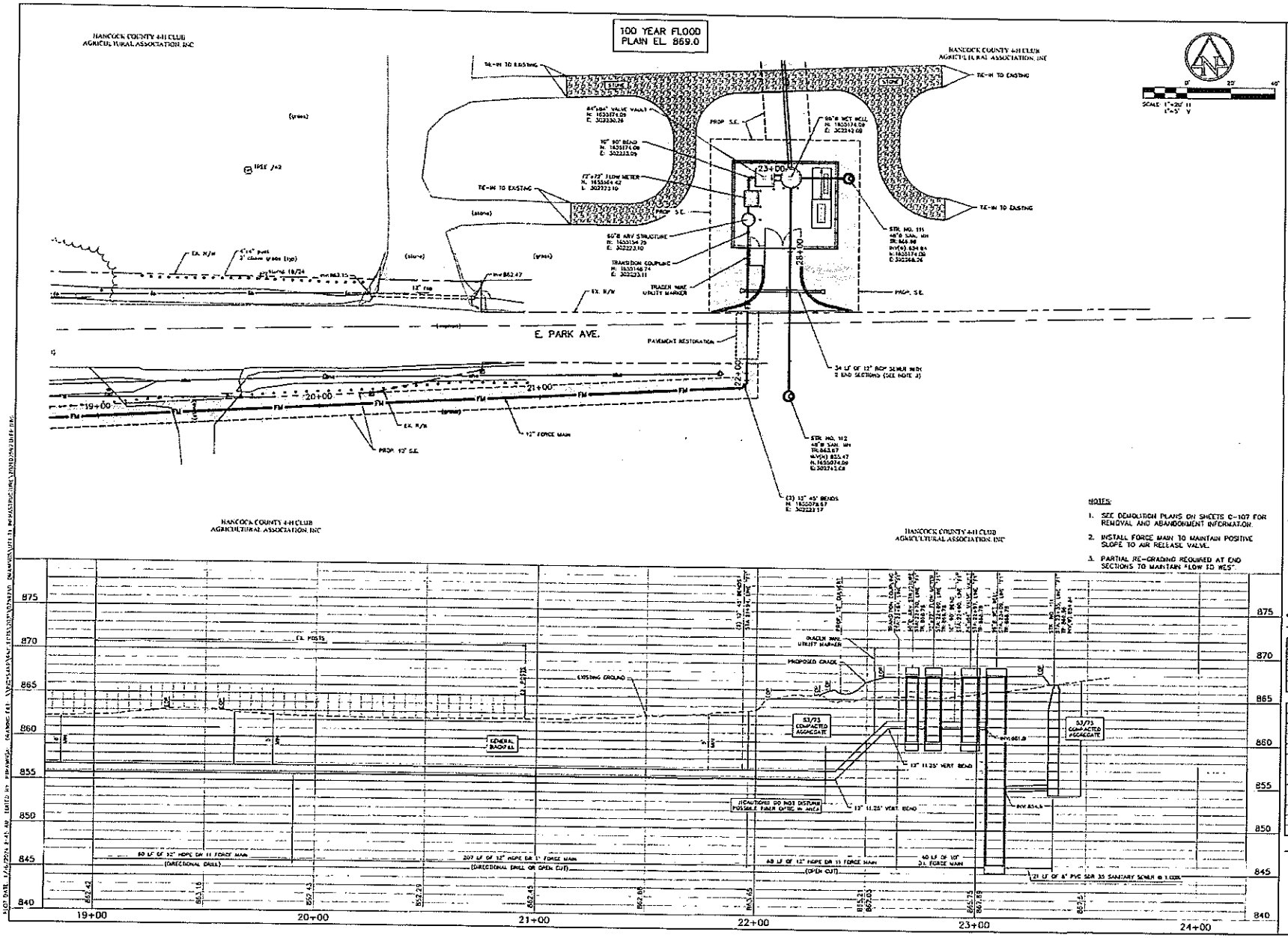
ISSUANCE INDEX
DATE
1/12/2024
PROJECT PHASE
CONSTRUCTION DOCUMENTS

REVISION SCHEDULE		
NO.	DESCRIPTION	DATE

Project Number 2021.02592

PLAN AND PROFILE SANITARY SEWER

C-112



CITY OF GREENFIELD

AMERICAN STRUCTUREPOINT INC

WATERVIEW LIFT STATION RELOCATION

Greenfield, Indiana

BRYANT HOOD REGISTERED No. 11500033 STATE OF INDIANA PROFESSIONAL ENGINEER

12/2024
CERTIFIED BY

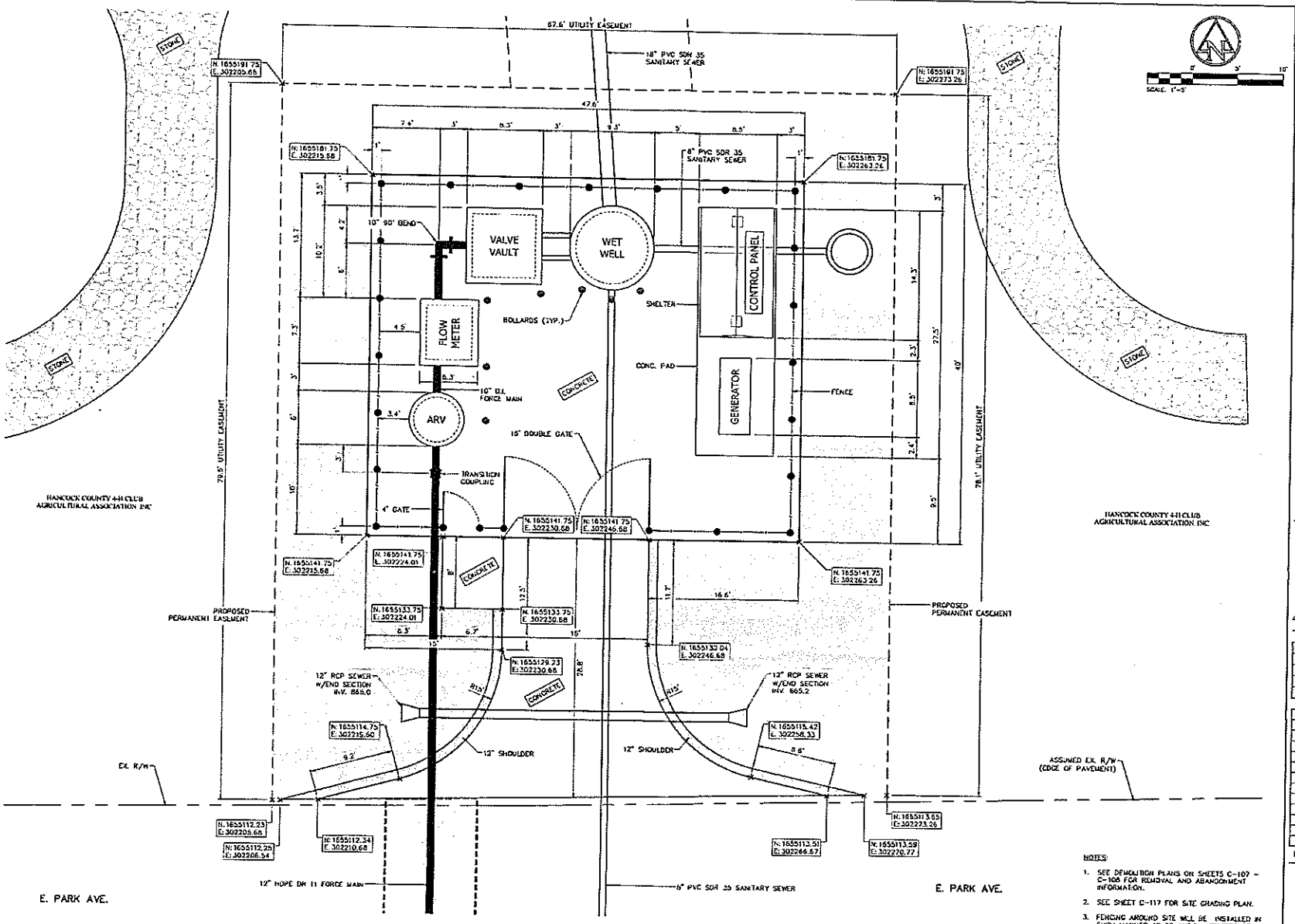
ISSUANCE INDEX
DATE
1/12/2024
PROJECT PHASE:
CONSTRUCTION DOCUMENTS

REVISION SCHEDULE		
NO.	DESCRIPTION	DATE

Project Number 2021.02592

PLAN AND PROFILE FORCE MAIN

C-115



NOTES:

1. SEE DEMOLITION PLANS ON SHEETS C-102 – C-108 FOR REMOVAL AND ABANDONMENT INFORMATION.
2. SEE SHEET C-117 FOR SITE GRADING PLAN.
3. FENCING AROUND SITE WILL BE INSTALLED IN SUCH MANNER AS TO AVOID INTERFERENCE WITH UTILITIES.

CITY OF GREENFIELD

AMERICAN STRUCTUREPOINT INC.

WATERVIEW LIFT STATION RELOCATION

Greenfield, Indiana

BRYAN L. HOWARD No. 11500233 STATE OF INDIANA PROFESSIONAL ENGINEER

1/12/2024
CERTIFIED BY

ISSUANCE INDEX
DATE
1/12/2024
PROJECT PHASE
CONSTRUCTION DOCUMENTS

REVISION SCHEDULE		
NO.	DESCRIPTION	DATE

Project Number 2021.02592

SITE PLAN PROPOSED

C-116